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**Abstract**

The Country Report offers an analysis of the R&I system in Malta for 2014, including relevant policies and funding, with particular focus on topics critical for two EU policies: the European Research Area and the Innovation Union. The report was prepared according to a set of guidelines for collecting and analysing a range of materials, including policy documents, statistics, evaluation reports, websites etc. The report identifies the structural challenges of the Maltese research and innovation system and assesses the match between the national priorities and those challenges, highlighting the latest policy developments, their dynamics and impact in the overall national context.

## **Acknowledgments**

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## **Executive summary**

This report was prepared according to a set of guidelines for collecting and analysing a range of materials, including policy documents, statistics, evaluation reports, websites, etc. The quantitative and qualitative data is, whenever possible, comparable across all EU Member State reports. It examines developments in the topics central to two EU policies – the European Research Area and the Innovation Union.

Malta is the smallest EU Member State with a population of 0.425m inhabitants in 2014 equivalent to just 0.08% of the EU total population. Malta weathered the recent economic downturn well and has a strong economy with low unemployment. In 2014 the GDP per capita stood at €18,600 equivalent to 68% of the EU average.

Research policy gained increasing prominence in recent years starting with preparations for Malta's accession to the EU in 2004, and the first Maltese national strategy for R&I was developed in 2007. The strategy had a strong business orientation, emphasising the importance of collaboration between industry and academia as well as the exploitation of research results for economic benefit.

In June 2014 a new National R&I Strategy was formally published. This builds upon the previous strategic plan, introducing a number of new elements whilst retaining the same underpinning vision. The strategy articulates three main goals as follows: (1) building a comprehensive R&I ecosystem, (2) developing a stronger knowledge base, and (3) smart, flexible specialisation. Development of a detailed action plan is currently underway and is scheduled for completion in mid-2015.

The National R&I Strategy also incorporates the Smart Specialisation Strategy which has identified seven main areas of specialisation together with ICT both as a horizontal enabler as well as being a specialisation niche in itself. However, the Smart Specialisation Strategy has only been articulated in broad terms and further work is underway to develop a more detailed and concrete plan of action.

R&D expenditure in 2013 stood at 0.85% of GDP compared to an EU average of 2.01%, with Malta ranking twenty-first within the EU. Nevertheless, this is a significant improvement over the 2009 figure which stood at just 0.54% of GDP. The business sector is the largest R&D performer, accounting for 54% of GERD, while the higher education sector accounted for 36% of GERD in 2013. R&D expenditure by public research organisations, at 10% of GERD, is one of the lowest in the EU. Malta has set itself the ambitious target of an R&D intensity of 2% by 2020.

In private enterprise, the sectors with the highest R&D expenditure in 2012 were pharmaceuticals and computer programming, which together accounted for 52% of BERD. Microenterprises and SMEs accounted for 66% of BERD in 2012, which is the highest in the EU, while the contribution of large enterprises is one of the lowest in Europe.

Malta has one public university, the University of Malta, which traces its origins back to the 16th century. It is the main research performer in the academic sector, with its research activity focused on Social Sciences followed by Medical Sciences, Engineering, Humanities and Natural Sciences in that order.

Many of the developments in the research and innovation system in recent years relate to increases in the availability of funding, with most of it coming from EU Structural Funds. Malta Enterprise introduced a number of schemes in 2009 and 2010 targeted at industry, while national funding for the R&I programme administered by the Malta Council for Science and Technology (MCST) more than doubled over the period 2009 to 2011 but thereafter remained almost constant. Funding schemes for PhD grants were also introduced utilising both national and EU finance. ERDF funding was also utilised to strengthen the research infrastructure at the University of Malta as well as for national projects such as the Life Sciences Centre. Nevertheless, funding levels for R&I are relatively low and remain a major issue.

While significant progress has been made in recent years, a number of challenges remain which need to be addressed. The most significant of these are listed below:

- Developing research excellence at the University of Malta;
- Investing in human capital;
- Increasing R&I in the private sector;
- Bringing research to market;
- Smart specialisation.

A number of initiatives have already been taken to address some of these challenges, but these need to be sustained and further effort is required to tackle these challenges. There is also a need for undertaking impact assessments to evaluate the effectiveness of initiatives and measures taken in recent years.

The National R&I Strategy expresses a commitment towards the ERA objectives, but does not identify a set of actions needed to achieve greater integration with other EU countries. Malta has allocated funding for participation in the ENIAC Joint Undertaking and in two EraNets, and Maltese researchers participate in projects funded under Clean Sky 1, ENIAC JU, and SESAR JU. International cooperation does take place, especially in the academic sector, and a review of internationalisation activity was completed in early 2015. However, there is very limited funding for international cooperation.

With reference to Innovation Union Commitments, 2014 saw significant advances in science-based entrepreneurship with the launch of the Takeoff Business Incubator and Seed Fund at the University of Malta. Knowledge transfer between industry and academia remains a challenge despite sustained efforts by the University to promote such interaction. Structural funds were successfully leveraged to develop a grant scheme to encourage innovation in industry. However, a number of areas remain a cause for concern such as the lack of innovative public procurement.

In terms of the Innovation Union Scoreboard, Malta belongs to the group of moderate innovators, and stands in twenty-second place with a score of 0.319 compared to an EU average of 0.554. Malta experienced growth in the IUS summary innovation index over the period 2006 to 2010 but then slipped in subsequent years, mainly due to deterioration of its scores in the *economic effects* indicators.

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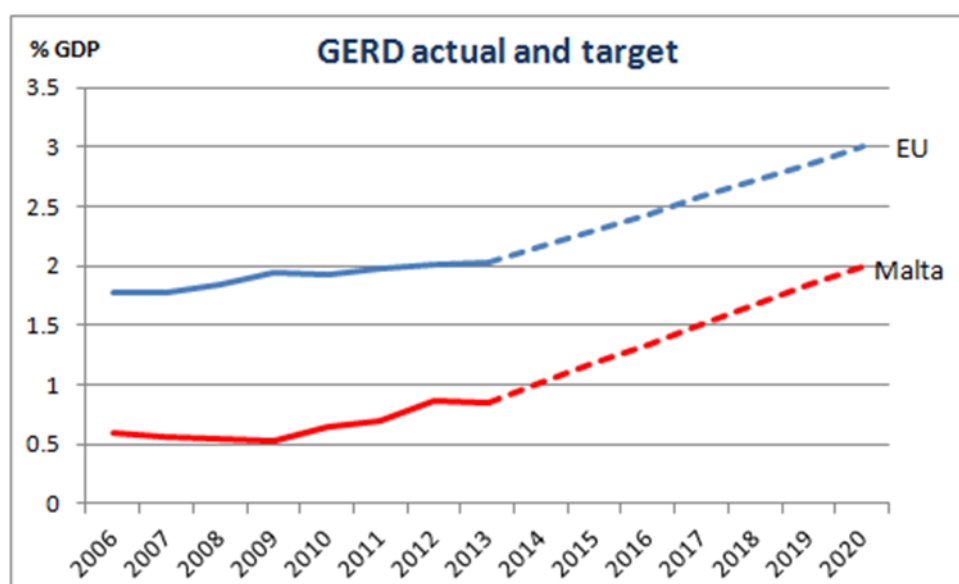
# 1. Overview of the R&I system

## 1.1 Malta in the European RDI landscape

The Maltese archipelago consists of two main islands, Malta with a land area of 247 square kilometres and Gozo with an area of just 69 square kilometres. With a population of just over 425,000 inhabitants in 2014, Malta is the smallest EU Member State accounting for about 0.08% share of the EU-28 total population. In 2014 GDP stood at €7.96b, with a GDP per capita of €18,600 corresponding to 68% of the EU28 average. Real GDP growth was negative in 2009 but was positive in subsequent years, consistently outperforming the EU27 average since 2007 (Eurostat May 2015).

R&D expenditure (GERD) in 2013 stood at 0.85% of GDP compared to an EU average of 2.01%. Spending on R&D showed a slight negative trend over the period 2006 – 2009, but increased significantly over the next three years reaching 0.86% of GDP in 2012 before dipping slightly to 0.85% in 2013 (Eurostat May 2015).

**Figure 1 Malta and EU GERD performance as % of GDP and 2020 targets**



Despite this positive performance, Malta still ranks twenty-first in the EU in terms of R&D intensity. It has set itself a rather ambitious target of achieving an R&D expenditure of 2% of GDP by 2020 (MCST, June 2014), but no details are yet available regarding how this increase will be financed and achieved. It is expected that such details will be made available in the rolling R&I Action Plan scheduled for completion in mid-2015.

## 1.2 Main features of the R&I system

The structure of the research and innovation governance system in Malta is simple and relatively stable, with well-defined responsibilities and with the key organisations having been in place for well over a decade. Due to Malta's small size, research and innovation



policy development and implementation are addressed at a national level and there is no regional dimension.

2013 saw the establishment of a Parliamentary Secretariat with responsibility for Research and Innovation. In 2014 an inter-ministerial core group and a high level technical steering group were set up to oversee the implementation of the national R&I strategy under the stewardship of the Malta Council for Science and Technology. However, this group is not an officially constituted government body and lacks a formal mandate.

### ***1.3 Structure of the national research and innovation system and its governance***

#### **Research Governance**

There exist three public bodies with responsibility for promoting research and innovation in Malta. These have the following responsibilities:

1. the Malta Council for Science and Technology (MCST) ([www.mcst.gov.mt](http://www.mcst.gov.mt)) is responsible for research and innovation strategy and policy, it acts as a central point for all science popularisation activities in Malta, and it is responsible for managing the FUSION Programme (incorporating the Technology Development Programme and Commercialisation Programme) which is the main R&I funding programme based on national funds. The MCST was the national contact organisation for the framework programme for many years, and is currently performing a caretaker role for Horizon2020 until responsibility for this programme is passed on to the Parliamentary Secretariat for EU Funds. The MCST reports to the Parliamentary Secretary for Research, Innovation, Youth and Sport within the Ministry for Education and Employment.
2. Malta Enterprise ([www.maltaenterprise.com](http://www.maltaenterprise.com)) is the national development agency and is responsible for the growth and development of Maltese enterprise, as well as for promoting and facilitating overseas investment in Malta. It operates a number of schemes promoting R&I in the private sector. Malta Enterprise falls under the Ministry of Economy, Investment and Small Business.
3. The Parliamentary Secretariat for EU Funds ([eufunds.gov.mt](http://eufunds.gov.mt)) within the Ministry for European Affairs houses the managing authority for EU Structural Funds. It will be taking over responsibility for the Horizon2020 Programme which was previously the task of the MCST.

In the private sector, the Malta Chamber of Commerce, Enterprise and Industry (MCCEI) is the main independent organisation representing the business sector in Malta and incorporates an RTDI Committee which actively participates in RTDI policy development. In 2012 it published a position paper proposing a number of actions for developing the R&I landscape (MCCEI, January 2012).

The Malta Chamber of Scientists represents the academic community in Malta but lacks organisational strength and is not very active in terms of input to the R&I policy-making process ([www.mcs.org.mt](http://www.mcs.org.mt)).

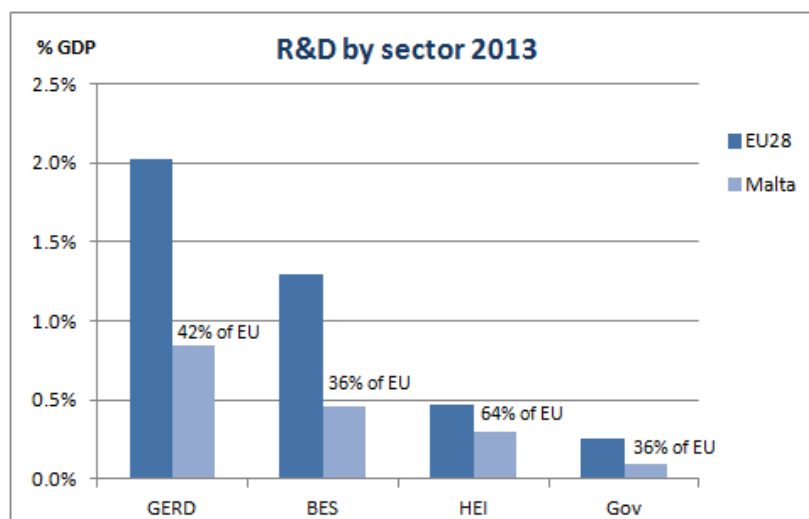
## Research Performers

The business enterprise sector (BES) is the largest R&D performer, with an expenditure of €35m (54% of GERD) in 2013. This has increased significantly in recent years and the 2013 figure represents an increase of 74% over the 2009 figure (Eurostat May 2015).

The University of Malta is the main research performer in the higher education (HEI) sector, and over the period 2009 - 2013 its research expenditure has more than doubled to €23m (36% of GERD). Most of the research is conducted in the field of Social Sciences followed by Medical Sciences, Engineering, Humanities and Natural Sciences in that order.

R&D expenditure by government and public research organisations is 9% of GERD and is one of the lowest in the EU. This is not surprising considering that Malta has only one public research organisation, the Malta Aquaculture Research Centre, which accounts for most of the research expenditure. A number of government departments (e.g. Agricultural Research & Development Unit, <http://www.agric.gov.mt/operations>) may be involved in research activities to some extent, but do not have a dedicated research budget.

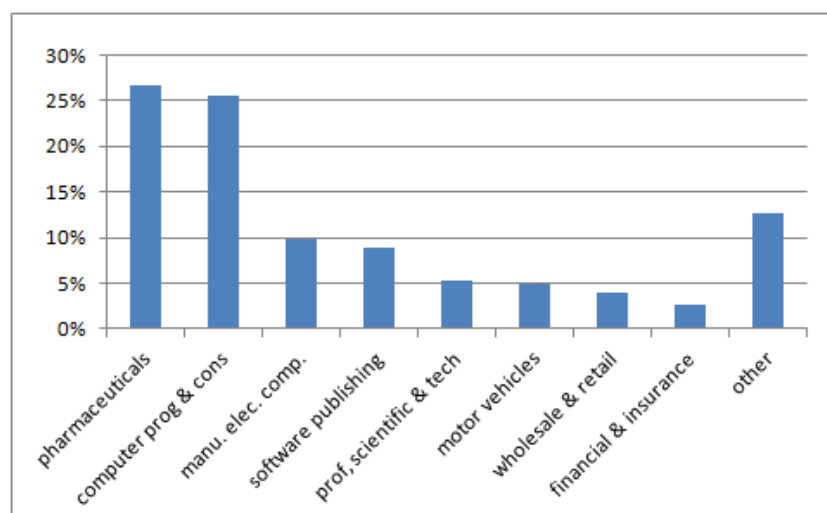
**Figure 2 R&D expenditure of the different sectors as % of GDP in 2013 (Eurostat Feb 2015)**



## Research Performers - Private Sector

In private enterprise, the sectors with the highest R&D expenditure in 2012 were pharmaceuticals (NACE Code C21) and computer programming (J62), which together accounted for 52% of BERD (Eurostat Feb 2015). Figure 3 below shows the contribution of the different sectors to private sector research.

**Figure 3 R&D expenditure of the different sectors as % of BERD in 2012 (Eurostat Feb 2015)**



Most of the R&I activity in the private sector is performed by a small number of organisations. Table 1 shows the total number of organisations by employment class as well as the number of organisations undertaking R&D activities in the business sectors with the highest R&D expenditure.

**Table 1: Contribution to BERD and number of organisations of the top R&D sectors in 2012 (NSO)**

Sector	% BERD	Firms performing R&D	Number of enterprises by employment size class			
			micro 0 - 9	Small 10 - 49	Medium 50 - 249	Large 250 +
pharmaceuticals	27%	6	23	3	2	2
computer prog. & consultancy	25%	21	1,567	32	6	0
manufacturing elec. components	10%	5	43	4	4	1
software publishing	9%	4	139	6	4	0
professional, scientific & technical	5%	52	4,720	62	17	3
manufacturing of motor vehicles	5%	?	23	0	0	1
wholesale & retail trade	4%	69	14,950	432	57	1
financial & insurance	3%	17	150	1	0	1
Other	13%	39	39,075	885	281	71
<b>Total</b>			<b>68,743</b>	<b>1,572</b>	<b>384</b>	<b>83</b>

Microenterprises and SMEs accounted for 66% of BERD in 2012, which is the highest within the EU, while the contribution of large enterprises is one of the lowest (Eurostat, April 2013, Science, Technology & Innovation in Europe – 2013 Edition).

**Table 2: R%D expenditure by organisation employment size class in 2012 (Eurostat Feb 2015)**

<b>Employment size class</b>	<b>0 – 9</b>	<b>10 – 49</b>	<b>50 – 249</b>	<b>250 +</b>
<b>Number of firms</b>	68,743	1,572	384	83
<b>R&amp;D as % BERD</b>	15.4%	28.8%	22.3%	33.6%

### **Main Changes in Recent Years**

With regard to governance structures, responsibility for the Malta Council for Science and Technology (MCST) moved from the Office of the Prime Minister to the Ministry for Education and Employment following a change of government in March 2013. In late 2014, it was announced that responsibility for Horizon2020 would be moving from the MCST to the Parliamentary Secretary for EU Funds within the Ministry for European Affairs although this change has yet to take effect. Also in 2014 a core group and a steering group were set up to oversee the implementation of the national R&I strategy.

At a strategic level, in 2012 the National Manufacturing Strategy (MCST, Dec 2011) was published followed by the Health Research and Innovation Strategy (MCST, 2013) in 2013. The National R&I Strategy 2020 (MCST, June 2014) was finally endorsed by government early in 2014 after a lengthy consultation and development process, and incorporates the national Smart Specialisation Strategy.

Many of the developments in the research and innovation system in recent years relate to the availability of funding, with the introduction in 2009 of the STEPS grant scheme for postgraduate (including PhD) studies (<http://education.gov.mt/en/education/myScholarship/Pages/STEPS.aspx>) followed by the launch of the 'Reach High' scholarship scheme for postdoctoral research grants (<http://education.gov.mt/en/education/myScholarship/Pages/Reach-High-Scholarships.aspx>) in 2015.

In 2010 Malta Enterprise launched a number of schemes targeted at industry (<http://www.maltaenterprise.com/support>). Concurrently, national funding for the R&I programme administered by the MCST doubled over the period 2010 to 2012, and a new Commercialisation Programme was introduced in 2012 (<http://www.mcst.gov.mt/fusion-ri-programme>). ERDF funding was also utilised to strengthen the research infrastructure at the University of Malta with significant funds being allocated to the development of a number of laboratories (<http://investinyourfuture.gov.mt/projects/research-science-and-technology-16842752>).

The University of Malta launched a Knowledge Transfer Office in 2009, followed by the Takeoff Business Incubator and Takeoff Seed Fund in 2014 (<http://www.takeoff.org.mt>). 2014 also saw the launch of the Entrepreneurship Centre run by the MCAST vocational college (<http://www.mcastentrepreneurship.com/about.php>).

In 2011 work got underway on the construction of the Life Sciences Centre ([www.lifesciencepark.com](http://www.lifesciencepark.com)), a state-of-the-art industrial park dedicated to the life sciences sector estimated to cost around €30 million (Ministry of Finance, April 2012, pp 119). In 2014 a Digital Hub was added to the complex, with both initiatives scheduled for completion in 2015. In 2014 work started on the construction of the National Interactive Science Centre, with a budget of almost €26m.

In May 2014 an ICT Innovation Hub was inaugurated at Smart City Malta (<http://mitainnovationhub.gov.mt>) and will be run by Malta Information Technology Agency (MITA), the government's IT agency. This initiative will complement and support existing incubators and innovation centres offering another alternative to students, start-up founders, innovators and ICT companies.

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**Main changes in 2009**

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Launch of STEPS grant scheme for postgraduate studies including Masters and PhD/doctoral studies.  
University of Malta established Knowledge Transfer Office.

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**Main Changes in 2010**

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Launching of R&D Grant Scheme and Innovation Actions Grant Scheme by Malta Enterprise.

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**Main changes in 2011**

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Work commences on Life Sciences Centre.  
Funding for National R&I Programme increased from €0.7m to €1.1m.

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**Main changes in 2012**

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Publication of National Manufacturing Strategy  
Launching of Commercialisation Programme with budget of €0.2m.  
Funding for National R&I Programme increased from €1.1m to €1.4m.

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**Main Changes in 2013**

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Appointment of Parliamentary Secretary for Research, Innovation, Youth and Sport.  
Publication of Health Research and Innovation Strategy.

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**Main Changes in 2014**

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Publication of National R&I Strategy 2020 incorporating the Smart Specialisation Strategy.  
Establishment of core group and steering group to oversee implementation of national strategy.  
Launching of Fusion Programme incorporating Technology Development Programme and Commercialisation Programme.  
University of Malta sets up Takeoff Business Incubator.  
Development work starts on National Interactive Science Centre.  
Launch of ICT Innovation Hub at Smart City Malta.  
Digital Hub added to Life Sciences Centre complex.

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**Main Changes in 2015**

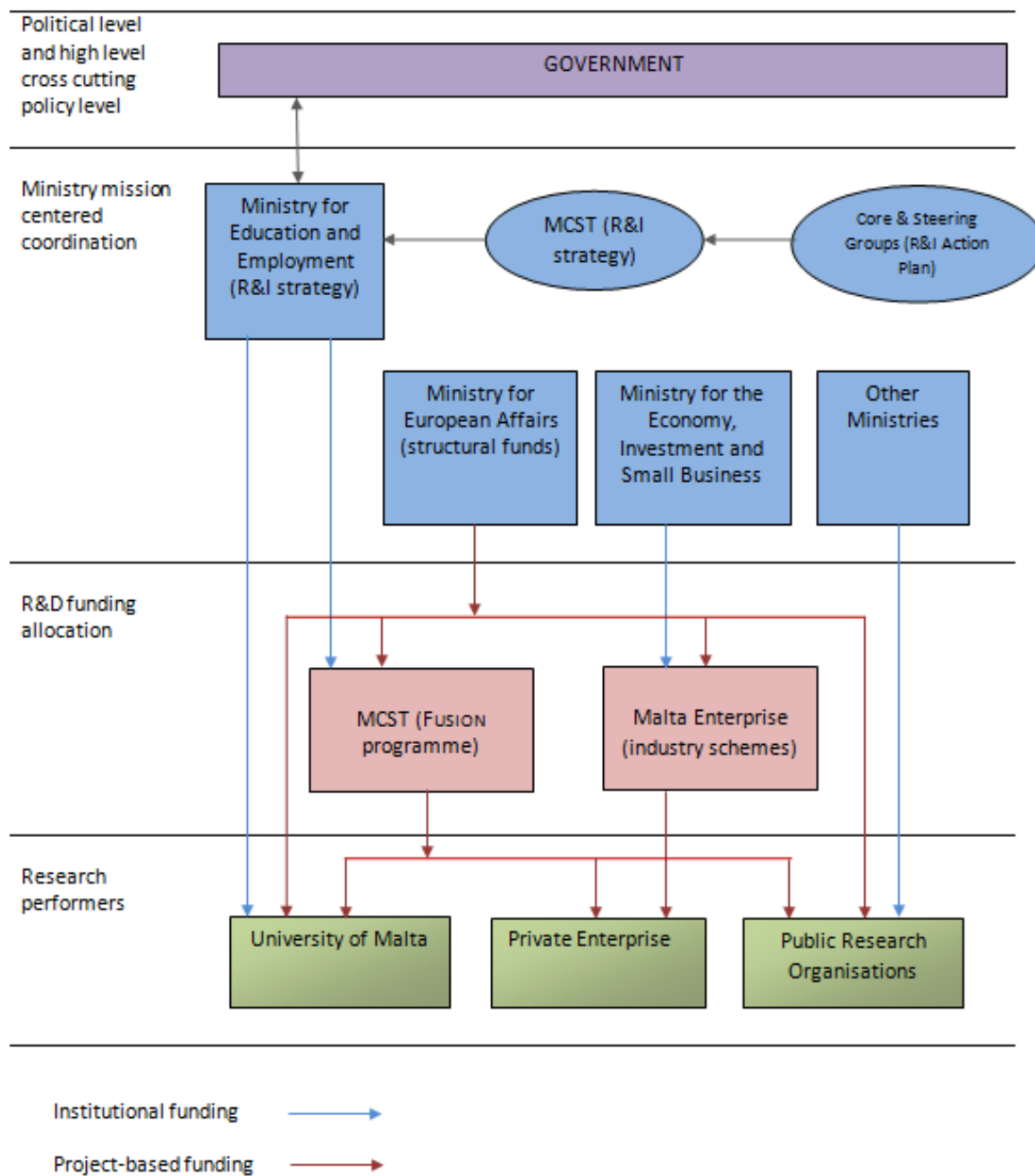
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Launching of Reach High Postdoctoral Scholarship Scheme.

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The figure below gives a snapshot of the Maltese R&I system that integrates facets of both research and innovation governance.

**Figure 4 The Maltese R&I system**



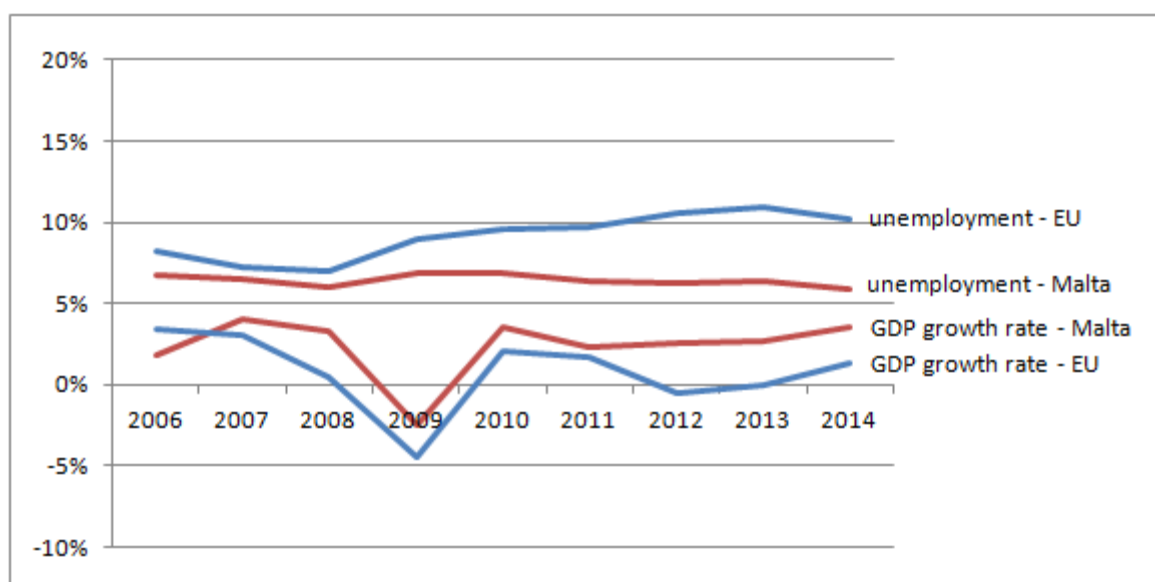
## 2. Recent Developments in Research and Innovation Policy and systems

### 2.1 National economic and political context

Malta weathered the recent economic downturn well, and did not suffer a collapse of its financial markets largely because it has a strong and conservative domestic banking and financial sector (EC May 2012). In 2014 the GDP per capita stood at €18,600, equivalent to 68% of the EU average. Real GDP growth was negative in 2009 but was positive in subsequent years and generally outperformed the EU as a whole (Eurostat May 2015).

Unemployment is low and stood at 5.9% compared to an EU average of 10.2% in December 2014 (Eurostat May 2015).

**Figure 5 GDP and unemployment trends in Malta and EU**



Malta has few natural resources and a minor primary sector, and its economy centres around manufacturing and services. While tourism and electronics have been important pillars of the local economy for a number of years, other sectors have recently emerged such as aircraft maintenance, financial services, online gaming and pharmaceuticals, indicating a shift in the economy towards higher value-added sectors and areas which are more knowledge intensive. Manufacturing output (GVA) has increased marginally over the years, but Malta's low competitiveness especially in relation to the Far East constitutes a significant barrier towards strong growth. In contrast, the services sector shows steady growth (especially ICT, financial services and professional services) with the result that whereas in 2004 industry accounted for 25% of Gross Value Added (GVA), in 2014 it only accounted for 16%. On the other hand, the services sector contributed to 82% of GVA in 2014, up from 73% in 2004 (Eurostat May 2015).

Following the general election of March 2013, the Labour Party was elected to government with a large majority after 25 years in opposition. Although the current government is centre-left and the Nationalist Party formerly in government had centre-right ideals, they share many common beliefs and there have not been any significant shifts in policy.

## **2.2 National R&I strategies and policies**

### **Strategy**

While 2013 saw the establishment of a Parliamentary Secretariat with responsibility for Research and Innovation, Malta still lacks strong political leadership in research and innovation. The multi-annual National R&I Strategy 2020 (MCST, June 2014) provides high-level policy orientations but does not include budgetary commitments. As at May 2015, the development of a detailed rolling action plan to complement the strategy is still under way and is scheduled for completion in mid-2015. Although formal networks of stakeholders (industry, regional and local authorities, parliaments and citizens) do not exist, the strategy was developed on the basis of widespread consultation with all relevant policy-makers and stakeholders including academia and industry representatives.

The current national strategy was formally endorsed by the Cabinet in February 2014 and has a time horizon until 2020. It builds upon the previous strategic plan, introducing a number of new elements whilst retaining the same underpinning vision. The strategy articulates three main goals as follows: (1) building a comprehensive R&I ecosystem, (2) developing a stronger knowledge base, and (3) Smart Specialisation.

The national strategy development process included a SWOT analysis of the local R&I ecosystem, although this does not appear to have been an in-depth exercise. The strategy makes only passing reference to the European Research Area, cross-border cooperation and joint programming, but nevertheless expresses a commitment to achieve these European objectives.

The strategy addresses research and innovation in an integrated fashion, covering academia, industry and human resources. It has a strong focus on close-to-market research and innovation, and does not make reference to frontier science and fundamental research, which is generally acknowledged to be one of the strengths of the University of Malta. The strategy also makes reference to research infrastructure, but in the Maltese context this refers primarily to development of research facilities at the University of Malta.

The National R&I Strategy 2020 is a very high-level document and does not provide any detail on funding commitments, concrete initiatives or specific measures to achieve its aims. These should become clearer once the planned rolling R&I Action Plan is finalised and published.

The overarching strategy is complemented by thematic research strategies for manufacturing (MCST, Dec 2012) and for health (MCST, 2013). In addition, research in the field of ICT is touched upon in the national ICT strategy (Parliamentary Secretariat for Competitiveness and Economic Growth, March 2014) as well as in the digital gaming strategy (GamesAudit, Feb 2012).

The Smart Specialisation Strategy has been finalised and incorporated into the national strategy, and identified the following seven areas of specialisation:

- tourism product development;
- maritime services;
- aviation and aerospace;
- health, with a focus on healthy living, active ageing and e-health;



- resource-efficient buildings;
- high value-added manufacturing with a focus on process and design, and
- aquaculture.

In addition, ICT was identified both as a horizontal enabler across all identified specialisation areas, as well as a Smart Specialisation niche in itself. R&I opportunities in rural development were also highlighted.

There have not been any recent laws or regulations which have an impact on the R&I ecosystem. One factor which could significantly affect R&I activity is the drying up of funds sourced through the EU Structural Funds on account of the end of the programming period in 2013. In recent years these funded a number of support measures targeted at industry as well as the Life Sciences Centre and numerous infrastructure projects at the University of Malta. The new operational programmes have now been finalised and it is expected that this source of funding will resume in the near future.

### Funding Programmes

The main sources of public funding for research and innovation are as follows:

- **Fusion National Funding Programme.** Formerly the National R&I Funding Programme, this is now divided in two distinct programmes as noted below with a combined annual budget of €1.6m:
  - **Commercialisation Voucher Programme** This is funded by central government and managed by the Malta Council for Science and Technology. It is open to both academia and industry, and has as its main objective funding of activities that support the assessment of commercialisation potential prior to the actual undertaking of any research and development of innovative ideas (market research, product development costing, risk profiling, IP check, initial patent registration, etc.) (<http://www.mcst.gov.mt/commercialisation-vouchers>). This is a precursor to the Technology Development Programme.
  - **Technology Development Programme** (This is funded by central government and managed by the Malta Council for Science and Technology. It is open to joint initiatives between academia and industry, and has as its main objective the funding of actual development of the research and innovation proposal with the possibility of having a prototype of the proposed solution. It focuses on the priorities identified in the smart specialisation strategy (<http://www.mcst.gov.mt/taxonomy/term/138>).
- **University of Malta funds.** Although not strictly speaking a research funding programme, the funding allocated by central government to the University of Malta finances most of its research and is estimated at about €20m in 2013, up from €13m in 2010 (Ministry of Finance, Financial Estimates 2015).
- **Reach High Post-doctoral Grant Scheme.** This scheme provides grants of up to €200k to doctoral graduates to undertake research projects in a higher educational institution, either in Malta or overseas. The scheme has a financial allocation of €2m and is funded through EU Structural Funds.

A number of other funding schemes sourced through EU Structural Funds have recently come to an end but are listed below for the sake of completeness:

- **R&D Grant Scheme.** This programme was launched in 2009 and was managed by Malta Enterprise with funding sourced through EU structural funds. It has now come to an end due to the closure of the EU programming period in 2013. The programme was targeted at industry and provided grants for research and experimental development. A total of €2.2m was committed for funding research projects in all thematic areas (Malta Enterprise, May 2015).
- **Innovation Actions Grant Scheme.** This programme was launched in 2009 and was managed by Malta Enterprise with funding sourced through EU structural funds. It has now come to an end due to the closure of the EU programming period in 2013. The programme was targeted at SMEs and provided grants for development and adoption of innovative processes, products and services. A total of €5.6m was committed for funding research initiatives in all thematic areas (Malta Enterprise, May 2015).
- **ERDF Funds.** These are administered by the Ministry for European Affairs and while not purely a research and innovation programme it included a substantial allocation for research and innovation initiatives. The funds were utilised among other things for University research infrastructure with an estimated value of €17.6m over the duration of the programme, although it is not clear whether this all qualifies as research-related expenditure (Parliamentary Secretariat for the EU Presidency 2017 and EU Funds, June 2014).
- **STEPS.** This scheme was launched in 2009 and was managed by the Ministry of Education with funding sourced through EU Structural Funds (ESF). It provided grants for individuals to pursue postgraduate studies including doctoral studies, and had a financial allocation of €9.1m over a 7-year period (<http://education.gov.mt/en/education/myScholarship/Pages/STEPS.aspx>).

The National R&I Strategy does not address the issue of generic vs thematic/sectoral funding, and does not set any targets for the funding mix. Of the existing funding streams, the Technology Development Programme and Commercialisation Programme are the only research programmes which operate on a thematic basis, focusing on the areas identified in the National R&I Strategy. Since the programmes have very limited funding there is no stipulated allocation of funding for the different thematic priorities, and neither is there funding for H2020 societal challenges. It is estimated that in 2013 about 12% of funding was allocated on a thematic as opposed to a generic basis.

### ***2.3 National Reform Programmes 2013 and 2014***

Malta's latest NRP, released in April 2014, highlights the new national target of achieving an R&D expenditure of 2% of GDP by 2020, up from the previous target of 0.67% which was achieved and surpassed in 2011. The NRP mentions a number of ongoing initiatives such as the development of a rolling R&I Action Plan in support of the national strategy, incentives for R&D in industry, the doctoral and post-doctoral scholarship schemes, the Centre for Entrepreneurship and Business Incubation (CEBI) set up at the University of Malta, the Life Sciences Centre, the National R&I fund, and the National Interactive Science Centre. An interesting new development is the proposed National Aerospace Centre, with a financial allocation of €150,000. (Ministry of Finance, April 2014, pp 28-29).

The NRP text is largely a list of these measures accompanied by a brief description of each one, with very little in the way of numerical data or reporting on the progress of the various measures. It fails to establish any specific indicators or targets, save for the 2% R&I intensity target mentioned earlier. It only makes passing mention of the European Research Area.

The NRP also fails to follow up on a number of initiatives mentioned in NRPs of previous years, such as the Health R&I Strategy, and innovation in the agriculture and food sectors.

The NRP section on R&I concludes by stating that the R&I Action Plan, once finalised, would consolidate ongoing and proposed actions into a clear roadmap which charts measures, timeframes, budgets and owners, thus ensuring a holistic approach to the implementation of measures addressing the R&I Strategy. The action plan is currently under development and it is expected that it will be published towards the middle of 2015.

## ***2.4 Policy developments related to Council Country Specific Recommendations***

n/a

## ***2.5 Funding trends***

### **2.5.1 Funding flows**

**Table 3: Basic indicators for R&D investments**

	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>EU28 (2013)</b>
GDP growth rate	-2.8%	4.3%	1.4%	1.1%	2.7%	0.0%
GERD (% of GDP)	0.52%	0.64%	0.70%	0.86%	0.85%	2.01%
GERD (€ per capita)	77.3	101.9	116.2	149.4	152.7	536.0
GBAORD - Total R&D appropriations (€ m)	9.5	14.6	14.8	20.3	22.1	90,505.6
R&D funded by Business Enterprise Sector (% of GDP)	0.33%	0.40%	0.46%	0.50%	0.46%	1.29%
R&D funded by Private non-profit (% of GDP)	0.00%	0.00%	0.00%	0.00%	0.00%	0.02% <sup>e</sup>
R&D funded from abroad (% of GERD)	18.4%	11.7%	18.1%	21.3%	20.2%	0.19% (2011)
R&D funded by Framework Prog. (% GDP)	0.02%	0.02%	0.03%	0.03%	0.03%	
R&D funded by the Structural funds (€) <sup>1</sup>					0.19m	
R&D related FDI						

<sup>1</sup> the data on structural funds (RIO elaboration of DG REGIO data) is low in comparison to data reported elsewhere such as last year's country report. One of the explanations for this difference is the definition adopted. The data presented here refers to Core RTD (See Annex for categories included), whereas the information provided elsewhere adopts a broader definition of RTDI and linked activities. In addition the data reported here refers to ERDF funding only and does not include cohesion funds.

	2009	2010	2011	2012	2013	EU28 (2013)
R&D performed by HEIs (% of GERD)	31.9	33.9	29.5	33.4	35.7	23.3%
R&D performed by Gov Sector (% of GERD)	4.7	4.2	5.1	8.6	10.2	12.2%
R&D performed by Business Enterprise Sector (% of GERD)	63.4	62.0	65.4	58.0	54.1	63.8%
Share of competitive vs. institutional public funding for R&D	12 / 88	29 / 71	15 / 85	12 / 88		N/A
Employment in high- and medium-high-technology manufacturing sectors as share of total employment	7.76	6.50	6.04	5.51		5.6% (2011)
Employment in knowledge-intensive service sectors as share of total employment	30.44	30.77	32.82	32.67		38.9% (2011)
Turnover from Innovation as % of total turnover	-	28.6	-	15.2		13.4% (EU-27, 2010)

Malta previously had a target of achieving an R&D intensity of 0.67% of GDP by 2020 but this has recently been increased to 2% (MCST, June 2014). However, the national strategy gives no indication how the target will be achieved, although it is expected that such details will be revealed in the R&I Action Plan currently under development. In the absence of such a plan, it is not possible to objectively assess the chances of achieving the 2% target. Significant increases in R&D expenditure over the period 2009 – 2012 provided encouraging signs, but a downturn in 2013 highlights the danger of making predictions in the absence of a roadmap providing a sound basis for a proper assessment.

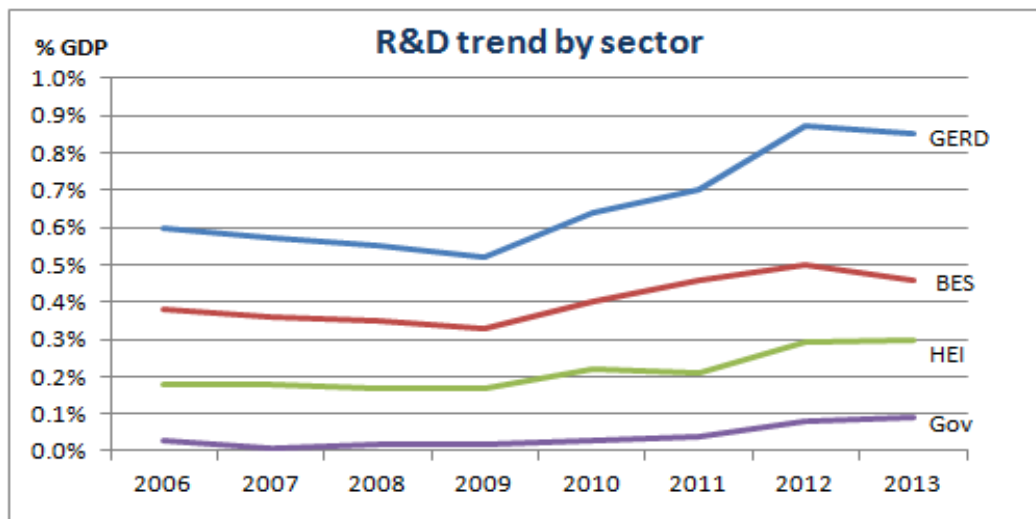
However, it is fair to say that the target appears somewhat ambitious, given that in 2013 GERD accounted for only 0.85% of GDP. Assuming a customary 2:1 ratio between private and public funding, the table below compares Malta's current and target R&D expenditure indicating that the greatest challenge is in the area of private sector research.

**Table 4: Comparison of current and target R&D intensity**

	R&D as % GDP (2013)	Target R&D as % GDP	Current as % of Target
<b>Private R&amp;D</b>	0.46	1.33	35%
<b>Public R&amp;D</b>	0.39	0.67	58%
<b>Total R&amp;D</b>	0.85	2.00	43%

The increased spending on R&D in recent years resulted from increases across all sectors as shown in figure 6 below.

**Figure 6 Research expenditure trends of different sectors as percentage of GDP (Eurostat)**



**Figure 7 Research expenditure trends by type of cost as percentage of GDP (Eurostat)**

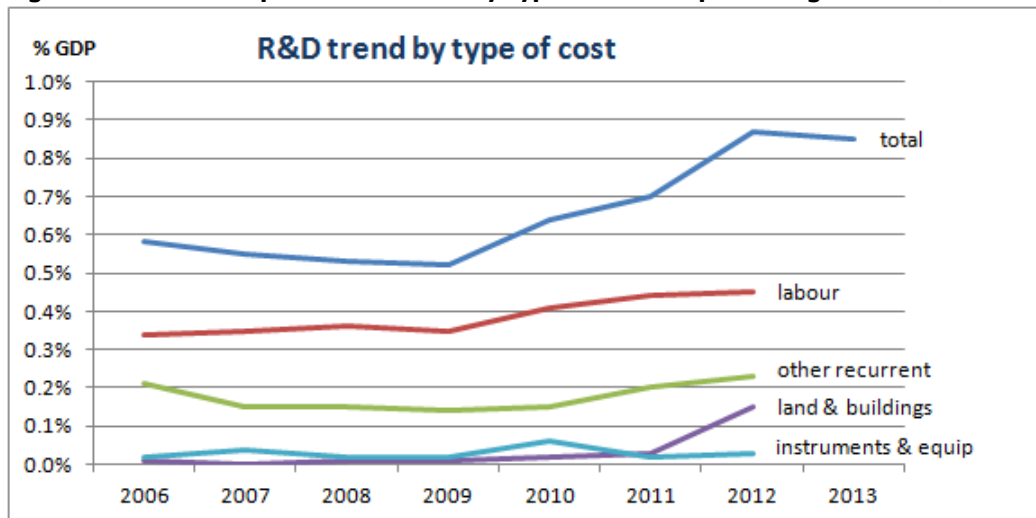
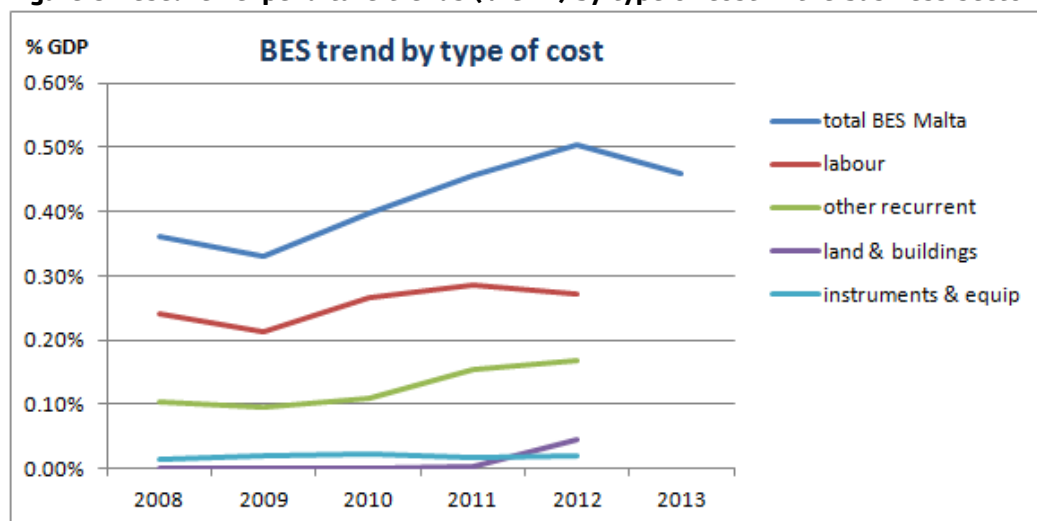


Figure 7 above shows that until 2011 increases in R&D were driven mainly by labour costs and other recurrent expenditure, while investment in land and buildings stands out as a major contributor to increases in 2012. A breakdown of expenditure data for 2013 is not available as at May 2015.

## Business

The business sector is the largest R&D performer, with an expenditure of €34.7m (54% of GERD) in 2013. This has increased significantly in recent years and the 2013 figure represents an increase of 72% over 2009.

**Figure 8 Research expenditure trends (%GDP) by type of cost in the business sector (Eurostat)**

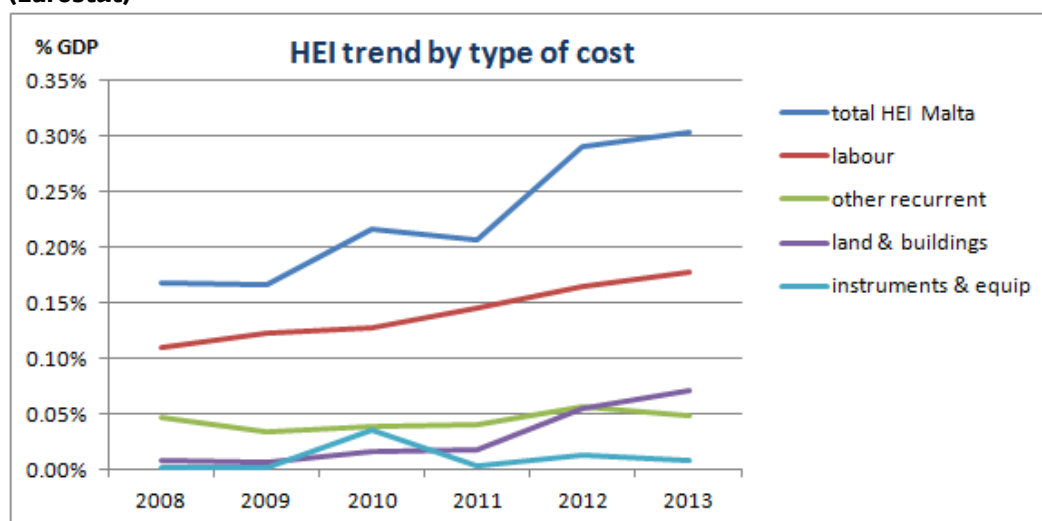


The increase in R&D expenditure over the period 2009 – 2011 was driven primarily by increases in personnel and other recurrent expenditure, while capital expenditure increased sharply in 2012. The increase in personnel costs was accompanied by a doubling in the number of R&D personnel (FTE) over the period 2009 - 2012, indicating a genuine increase in the volume of R&D work undertaken. R&I undertaken by the business sector in Malta has not been properly investigated, and there are few if any reports on the subject. The increase may be partly attributable to the R&D Grant Scheme introduced by Malta Enterprise in 2009, but may also incorporate an element of improved efforts by the national statistics agency to capture R&D expenditure by Maltese industry. The decrease in 2013 is probably related to the closure of a key pharmaceutical R&D centre in Malta following acquisition by another company (Times of Malta, March 2013).

### **Academia**

The University of Malta is the main research performer in the higher education sector, with an expenditure of €22.9m (36% of GERD) in 2013. This has increased significantly in recent years and the 2013 figure represents an increase of 130% over 2008 (Eurostat Feb 2015).

**Figure 9 Research expenditure trends (%GDP) by type of cost in the higher education sector (Eurostat)**

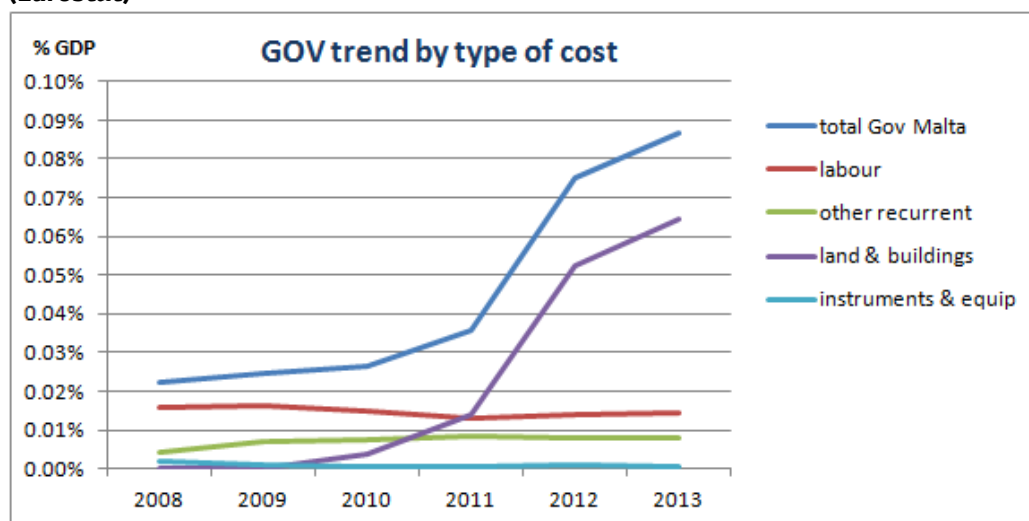


The increase in overall expenditure was driven by increases in personnel and infrastructure. While the expenditure on personnel costs increased by 79% between 2008 and 2013, the number of R&D personnel (FTE) only increased by 41% over the same period. This is ascribed to the coming into force of a new collective agreement during that period which saw University staff benefitting from significant salary increases.

Recent years also saw a significant increase in expenditure on buildings and instrumentation, where a number of infrastructure projects funded through EU Structural Funds for new laboratories at the University of Malta got underway. It is expected that the level of expenditure could taper off in 2015 and subsequent years following the completion of the current projects. While it is expected that there will be further investment in infrastructure funded through the next ERDF programming period (Ministry for European Affairs, March 2015, OP I), it is likely that there will be some delay until these get underway which could lead to a temporary dip in R&D expenditure in the higher educational area.

## Gov/PROs

**Figure 10 Research expenditure trends (%GDP) by type of cost in the government sector (Eurostat)**

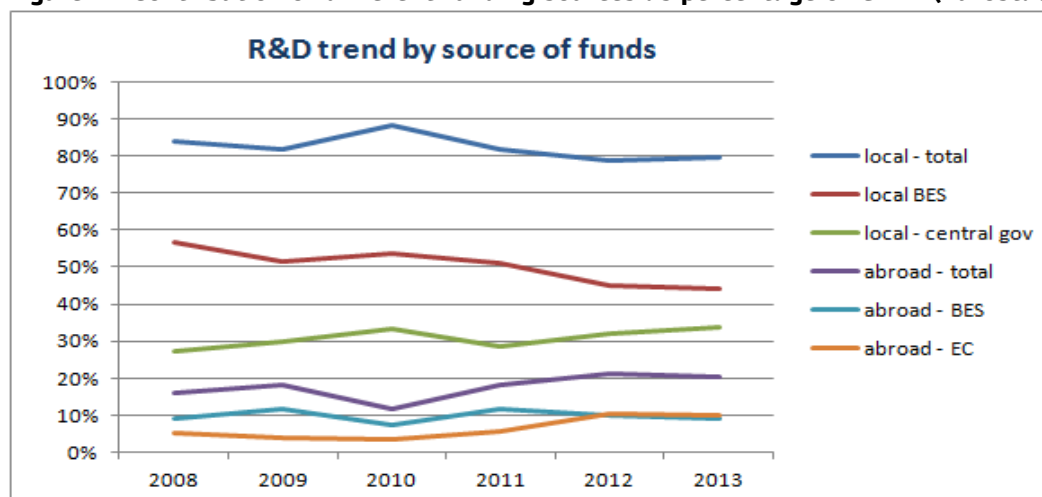


R&D expenditure by government and public research organisations is one of the lowest in the EU and expenditure on personnel has been decreasing when expressed as a percentage of GDP. In contrast, capital expenditure has increased from practically zero in 2008 to almost €5m in 2013, primarily related to construction costs for the Life Sciences Centre (NSO 132/2014).

## Sources of Funding

Since 2010, EU Structural Funds have been utilised for funding public research infrastructures, laboratories at the University of Malta and for research schemes for industry, causing a shift in the funding patterns. It is estimated that in 2013, EU Structural Funds accounted for approximately 16% of GERD.

**Figure 11 Contribution of different funding sources as percentage of GERD (Eurostat)**





The percentage contribution of local funding shows a slightly negative trend, decreasing from 84% of GERD in 2008 to 80% in 2013. This is mainly due to a decrease of 12 percentage points in the contribution of local business, partially countered by an increase of 7 percentage points in government funding over the same period (Eurostat).

Funding from abroad increased from 16% in 2008 to 20% in 2013, mainly as a consequence of the increased use of EU Structural Funds, while the percentage contribution of business funding from abroad remained largely unchanged.

Cross-funding between sectors is very low, with businesses largely funding their own research and central government providing funding for the University of Malta and public research.

The EU research framework programme (FP7) is another important source of research funding, and Maltese entities obtained a financial allocation of just over €21m through FP7, or approximately €3m annually equivalent to 4.7% of GERD in 2013.

### **2.5.2 Project vs. institutional allocation of public funding**

The Education Act of 1988 (Chapter 327 of the Laws of Malta) deals with the University of Malta, while the Malta Enterprise Act of 2003 establishes Malta Enterprise Corporation as a public entity with responsibility for promoting enterprise in Malta, and giving it the mandate to establish schemes related to its mission.

There have not been any changes to the legal framework for allocation of R&D funding in recent years. Furthermore, the National R&I Strategy 2020 does not address this topic and it is not expected that there will be any changes in the foreseeable future.

The main funding bodies responsible for allocating research funds are the following:

- The **Ministry for Education** is responsible for funding the University of Malta on the basis of a block vote. It is estimated that approximately €20m from University funds were utilised for research activity in 2013. Of this only €0.7m is disbursed by the university on a project-based competitive basis (Bartolo A., July 2011). The Ministry for Education is also responsible for the Reach High Post-doctoral Grant Scheme which was launched in 2015.
- The **Malta Council for Science and Technology (MCST)** manages the Fusion Programme which incorporates the Technology Development Programme and the Commercialisation Programme with a combined annual budget in the region of €1.6m. This is project-based funding and is disbursed on a competitive basis. The programmes are open to academia, industry, PROs and NGOs. The MCST is not authorised to manage schemes funded through Structural Funds thus making it dependent on the national government for funding (MCST. Fusion: the R&I Programme).
- **Malta Enterprise** manages a number of schemes targeted at industry and allocated on a competitive project basis. It is recognised as an intermediary body which means that it has the mandate for utilisation of EU Structural Funds for its funding schemes and can disburse such funds to third parties. In 2010 it introduced a number of important schemes which came to an end in 2013 on account of the EU programming period. The key scheme is the R&D Grant Scheme which provided grants for research and experimental development and had a total financial

commitment of approximately €2.2m over the period 2009 - 2013 (<http://www.maltaenterprise.com/en/support/erdf-research-and-development-grant-scheme>).

- the **Parliamentary Secretariat for EU Funds** ([eufunds.gov.mt](http://eufunds.gov.mt)) within the Ministry for European Affairs is responsible for administration of EU Structural Funds. There is no specific allocation for research and innovation. The total EC contribution to R&D funding in Malta in 2012 was €6.4m according to Eurostat. Within FP7 Malta received around €21m over the seven year period. The remaining budget has come mainly from the structural funds. In 2012 €2.7m of EU SF was implemented in core R&D (RIO elaboration on DG REGIO data). This data is not fully compatible with the Eurostat data and it is not possible on the basis of these figures to make a complete estimate of the amount of EU SF invested in R&D in 2012. It is estimated to be around 3-4 million euro.

The situation is summarised in the table below:

**Table 5: Allocation of funding 2013**

Funding Agency	R&I Euro 2013	Institutional funding %	Project-based funding %	beneficiaries	comment
Ministry of Education	20.0m	100%	0%	University of Malta	
MCST	1.6m	0%	100%	all categories	
Malta Enterprise	0.7m	0%	100%	industry	Research fund only, estimate.
Ministry for European Affairs	5.0m	0%	100%	Public bodies	Estimate.

In terms of central government funding, it is estimated that in 2012 approximately 92% of this was allocated on an institutional basis. If one also brings EU structural funds into the picture, then the figure falls to 71% for the same year. The mix of institutional vs project-based funding fluctuates from year to year but increasing use of structural funds in recent years has reduced to some extent the previous very strong bias towards institutional funding.

### **Institutional Funding**

In Malta the allocation of public research funds for higher educational institutions, government departments and research organisations does not involve performance considerations, certainly not in any formal sense. There exists no algorithm for allocation of public funds, and there is no history of institutional performance assessments to feed into such a mechanism. Funding is allocated primarily on the basis of what was allocated in previous years, and there has been no mention of changing this approach either in the national strategy or in any other document.

### **Project Funding**

The main research and innovation funding programmes are the following:

- Commercialisation Voucher Programme** (under the Fusion Programme). This is funded by central government and managed by the Malta Council for Science and

Technology. Funding is on a competitive basis, and the structure of the proposal template implies the use of three evaluation criteria although these are not clearly specified in the rules of participation. Similarly these do not specify the constitution of the evaluation board (MCST. Fusion: the R&I Programme).

- **Technology Development Programme** (Under the Fusion Programme, formerly the National R&I Funding Programme). Evaluation criteria include alignment with the programme objectives, quality of the project plan, strength of consortium, project outputs, dissemination and budget, but the programme regulations do not specify a scoring matrix. Neither does it provide details of the constitution of the evaluation board (<http://www.mcst.gov.mt/taxonomy/term/138>).
- **Reach High Post-doctoral Grant Scheme** managed by the Ministry for Education and funded through EU Structural Funds. Evaluation criteria are specified in the relevant regulations, while the constitution of the project selection board is not.

The following programmes came to a close in 2013 but they are included for the sake of completeness since GERD figures and much of the discussion in this report relate to 2013.

- **R&D Grant Scheme.** This programme was managed by Malta Enterprise with funding sourced through EU structural funds. Evaluation criteria include 35% of the score for risk factors, need for support and holistic nature, 55% for project impact, SMEs, innovation and employment, and 10% for environmental sustainability and equal opportunities. There are no details on the constitution of the evaluation panel (<http://www.maltaenterprise.com/en/support/erdf-research-and-development-grant-scheme>).
- **Innovation Actions Grant Scheme.** This programme was managed by Malta Enterprise with funding sourced through EU structural funds. It had an evaluation framework identical to the R&D Grant Scheme above ([www.maltaenterprise.com/en/support/erdf-innovation-actions-grant-scheme-innovation](http://www.maltaenterprise.com/en/support/erdf-innovation-actions-grant-scheme-innovation)).
- **ERDF Funds 2006-2013.** These were administered by the Ministry for European Affairs. Evaluation includes justification of need to implement the project, alignment with national priorities, contribution towards operational programme indicators, contribution towards horizontal objectives, project sustainability, state of readiness to undertake the project and quality of the application. There are no details on the makeup of the evaluation panel.

## Other allocation mechanisms

Public procurement of R&D services is not commonplace in Malta. One of the few examples is the MCST Manufacturing Research Project, which involved outsourcing of manufacturing research to performers from university and from the private sector.

## Assessment

While the proportion of public funding allocated on an institutional basis is very high compared to other EU countries, this in itself is not a major problem given that Malta has only one public university and only one public research centre. In any case, the institutional funding to the University of Malta goes mainly towards salaries of lecturing staff, and because of this the only way to change the funding balance is to increase the level of project funding rather than by changing the mechanisms for allocation of existing funding.

As a first step, introducing additional funding based on research performance considerations would constitute a positive development.

Other than that, project funding as a rule is allocated on a sound competitive basis and largely conforms to the principles of international good practice.

### **2.5.3 R&I funding**

There is no single programme which caters for the entire value chain from fundamental research through to market innovation. However, the various programs together do provide a fairly comprehensive funding regime, although the general level of funding is very low. University funding focuses largely on fundamental research while all other programmes (Technology Development Programme, Commercialisation Programme, R&D Feasibility Study Scheme, R&D Grant Scheme and Innovation Action Grant Scheme) focus on applied research and commercialisation.

The various funding schemes seek to leverage private sector investments since they require co-financing on the part of private enterprise.

Apart from direct funding, tax incentive schemes for industry have been in place for a number of years. These include:

- **the R&D Tax Credit Scheme:** this scheme came to a close in 2014 and provided tax credits to private enterprises undertaking industrial research or experimental development projects. Eligible expenditure included both capital and recurrent costs including personnel costs. The scheme has now been replaced by the R&D 2014-2020 Scheme which incorporates the previous R&D tax credit scheme as well as a grant scheme for Eureka endorsed projects ([http://www.maltaenterprise.com/sites/default/files/support\\_measures/rd\\_2014-2020\\_version\\_1\\_post\\_samb\\_clarifications.pdf](http://www.maltaenterprise.com/sites/default/files/support_measures/rd_2014-2020_version_1_post_samb_clarifications.pdf)).

Unfortunately the uptake of these scheme was very low (Ministry of Finance, April 2013, pp 119), in contrast to the direct funding schemes which are generally fully subscribed. The reasons for this are not clear.

- **the Royalty Income from Patents Scheme:** the scheme provides exemption from income tax to organisations receiving income from royalties paid by third parties for use of patented IP. The third party must be using the IP in a productive economic activity such as manufacturing, software development or data processing (<http://www.maltaenterprise.com/en/support/royalty-income-patents>).

There are no innovative financing solutions such as public-private partnerships.

Funding schemes for innovation include the Technology Development Programme, the Commercialisation Programme and the Innovation Actions Grant Scheme. These schemes have already been described in previous sections of this document.

## **2.6 Smart Specialisation (RIS3)**

Malta's Smart Specialisation Strategy has been incorporated into the National R&I Strategy 2020 which was published in early 2014. In its current format, areas of specialisation have been identified but no specific targets or lines of action have been set. The Malta Council

for Science and Technology plans to take this forward by developing tailored actions and initiatives for each area of specialisation based on an in-depth analysis covering legislation, standards, and issues of public perception and other factors which influence innovation potential. Funding plans will involve the utilisation of both national and EU funds (such as ESF, ERDF, the European Agricultural Fund for Rural Development – EAFRD, and the European Maritime and Fisheries Fund – EMFF) and EU public-public or public-private initiatives (e.g. Joint Technology Initiatives, Joint Programming Initiatives, etc.) to set up or strengthen nodes of activity to improve their innovation capabilities.

The expected rolling action plan will pursue specific innovation opportunities based on economic and business potential, expected benefits to society or a combination of both. To this end, thematic areas will have innovation, business needs and objectives at their forefront, with support from the public and academic sector as required. Through this set up, specific niches for innovation opportunities will need to be identified for each thematic specialisation area.

The national strategy specifies that a monitoring and evaluation mechanism will be established to review progress and ensure that the strategy is updated as necessary over time.

## ***2.7 Evaluations, consultations, foresight exercises***

Malta lacks a comprehensive system for monitoring and evaluation of R&I activity, and there is a general reliance on analysis, reports and statistics produced by the EC (e.g. the innovation union scoreboard) and by the national statistics office. However, there have recently been positive developments such as the survey of participation in the COST programme (MCST, Oct 2014) and the review on participation in FP7 which also addressed the identification of barriers and remedial action (MCST Jan 2015). However, it appears that there has not been any analysis or evaluation of local funding programmes although an evaluation is scheduled for end 2015.

In recent years the QUEST III macroeconomic model has been used to assess the impact of R&I on economic growth (Ministry of Finance, April 2015). This is a Dynamic Stochastic General Equilibrium (DSGE) model developed by the European Commission and adapted specifically to the Maltese economy. However this exercise was very limited in scope and only one scenario was modelled relating to the effect of a tax credit incentive which could increase R&I intensity to 1% of GDP by 2020.

The culture of consultation in the development of research policy documents is now firmly engrained in the Maltese mind-set. The National Strategy published in February 2014 was developed by the Malta Council for Science and Technology on the basis of widespread consultation with all relevant public sector entities as well as with academia, the private sector, private sector representatives and social partners. Around 20 meetings with top government officials, public entities and social actors as well as one-to-one meetings with a number of private sector stakeholders were held. Focus group meetings with private stakeholders and meetings at political level were also held. The smart specialisation strategy which constituted part of the national strategy was submitted for peer review in June 2013 under the aegis of the JRC peer review workshops initiative prior to finalisation. Other initiatives which have adopted this consultative approach in recent years include the Manufacturing Research Strategy, the Health Research Strategy and the Digital Gaming Strategy.

Similarly there is no evidence of foresight exercises, surveys or intelligence gathering to improve the knowledge base for policy conceptualisation and design having been undertaken in recent years. On the positive side, there do exist isolated initiatives such as the FP7 project (ERA PRISM) on policy requirements for research and innovation in small EU member states, which was conceived and coordinated by Malta.

### **3. National progress towards realisation of ERA**

#### **3.1 ERA priority 2: Optimal transnational co-operation and competition**

The National R&I Strategy 2020 mentions international cooperation and joint programming on a number of occasions, and proposes consideration of future policy action in these areas. A review of internationalisation activity was completed in early 2015 and its recommendations will feed into the development of the R&I Action Plan (MCST, 2015).

Malta's limited financial and human resources make it difficult to participate in transnational programme development initiatives. Allocation of national funding is based predominantly on national considerations and there is limited scope for development of joint research agendas. Nevertheless, Malta is participating in the ENIAC Joint Undertaking with an *ad hoc* allocation of a significant level of national funding (€2 million in 2013). Malta is also participating in two EraNets and has made funding available for local participants (<http://mcst.gov.mt/all/ri-funding-unit/international-programmes/previous-calls>). Maltese researchers participate in projects funded under Clean Sky 1, ENIAC JU, and SESAR JU.

Maltese delegates represent Malta on different groups/boards of the IMI 2 JU, Clean Sky 2 JU, and ECSEL JU (the follow-up to ENIAC JU). Until the end of 2014, Malta also followed a number of JPIs as an observer (JPI AMR, JPI HDHL, JPI Oceans) and as a member of JPI Urban Europe.

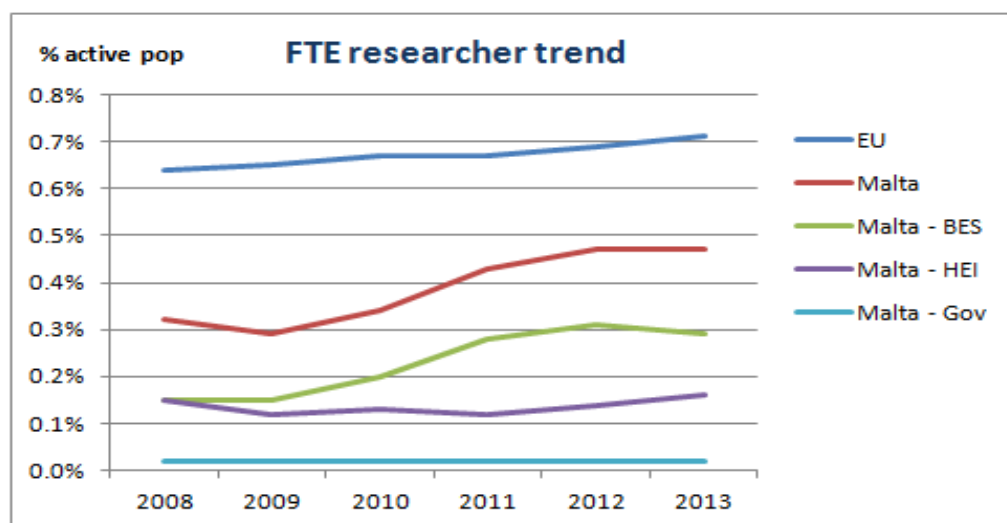
#### **3.2 ERA priority 3: An open labour market for researchers. Facilitating mobility, supporting training and ensuring attractive careers**

##### **3.2.1 Introduction**

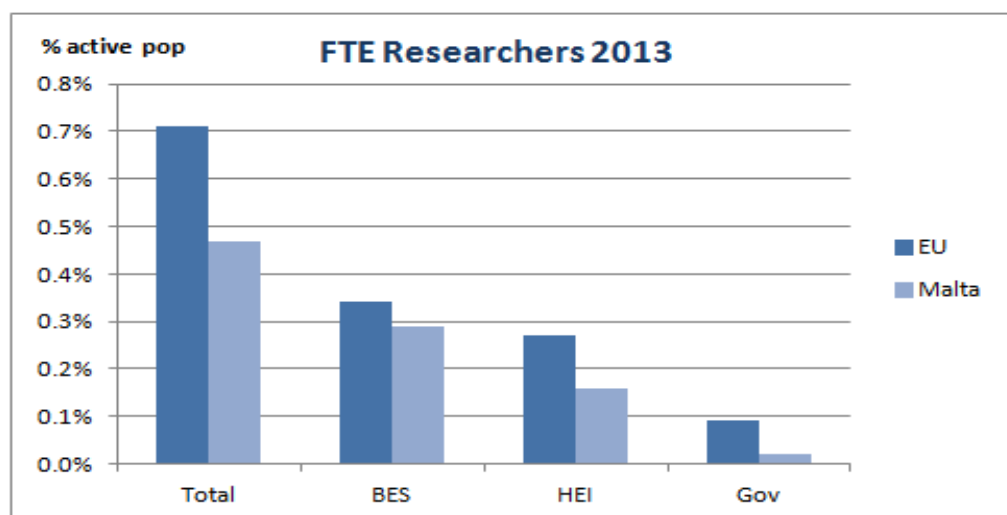
The University of Malta enjoys a high degree of autonomy and has established its own regulations regarding the recruitment and career progression of researchers. Public Research Organisations, on the other hand, are governed by the generic Public Service Management Code which applies to all public sector employees and does not make special provision for researchers.

Looking at the total researcher population, this has been increasing roughly in line with the expenditure on R&D. Nevertheless, in absolute terms the number of researchers is small, with only 875 FTE in 2013. The greatest growth has been in the business sector, where the number of FTE researchers has more than doubled over the period 2008 – 2013. The number of researchers in the government sector has also increased, but is so small as to be almost insignificant.

**Figure 12 Trend in FTE researchers as % of active population in Malta and EU**



**Figure 13 Breakdown by sector of FTE researchers as % of active population in Malta and EU**



In 2013 the number of FTE researchers in Malta accounted for 0.47% of the total active population, compared to 0.71% in the EU (Eurostat). This is surprisingly high, considering that GERD in Malta is only 0.85% of GDP compared to an EU average of 2.02%. The figures are even more surprising if one focuses on the business sector, where researchers constitute 0.29% of the active population compared to 0.34% in the EU, while BERD stood at 0.46% of GDP compared 1.29% in the EU.

Figures for supply and demand of researchers in Malta are not available.

### **3.2.2 Open, transparent and merit-based recruitment of researchers**

There are no national policies or measures promoting open transparent recruitment of researchers. Neither have there been any evaluation exercises assessing researcher recruitment processes.



However, the process for recruitment of researchers at the University of Malta is essentially open, transparent and based on merit. The University has documented and published recruitment guidelines which govern the recruitment process, selection criteria, constitution of the selection committee and appeals procedure. However, the composition of the selection panel is not published, and the selection criteria for evaluation of candidates are not clearly defined. University positions are publicised on the Euraxess portal through a link to the University website, although individual positions are not uploaded onto the portal and are thus not captured by the Euraxess search functionality.

The process for recruitment of researchers at Public Research Organisations is also essentially open, transparent and based on merit. Recruitment procedures are governed by the Public Service Management Code. Researcher vacancies are published in national portals but not on the Euraxess portal.

The University of Malta also benefits from a high degree of autonomy in development of strategy and practices regarding education, research and innovation. However, it is obliged to provide full-time education to EU students free of charge (although it is permitted to levy charges for part-time courses), severely impacting its ability to raise revenue and achieve greater financial autonomy.

Public research organisations also enjoy a degree of autonomy in relation to their research and innovation activities, but in practice their dependence on a limited financial allocation from central government does impose restrictions on the range of activities that they may undertake.

There are no legal or other barriers which hinder access to the scientific labour market by foreign researchers. Language does not constitute a barrier since English is one of Malta's two official languages and is the language of choice at tertiary education level. Malta has put in place the researcher visa regulations but there are no specific measures aimed at attracting foreign nationals.

Opportunities for researchers have improved in recent years, but Malta has a limited offering in terms of remuneration or research infrastructures. On the other hand it offers a good climate and good quality of life, which may account for the fact that the number of foreign researchers in Malta increased from 1 in 2007 to 71 in 2013, with 57 of these researchers coming from other EU countries.

Most researchers at the University of Malta are full-time permanent members of teaching staff who are involved in research on a part-time basis. This is borne out by the fact that while there were 665 researchers in HEI in 2011, this translated to only 222 full time equivalents (Eurostat Feb 2015). The University of Malta Collective Agreement (Collective Agreement, University of Malta, 2014) regulating employment conditions stipulates that resident academics are expected to spend one-third of their time in research activities. The Researchers' Report 2013 indicated that in 2012 only 4.8% of researchers were employed on fixed-term contracts, compared to an EU average of 34.3% (Deloitte, 2013). There is no reason to believe that the job market is becoming more unstable for younger researchers.

The research community in Malta is relatively young and Malta has the highest percentage of HRST in the 25-34 age bracket in the EU, with 49% of workers falling into this category compared to an EU average of 30%. This arises from the significant increases in the number of individuals following tertiary education and in the growth in research activity in the last two decades.

### **3.2.3 Access to and portability of grants**

In general cross-border access to national grants is not possible. In the case of the National R&I Programme (managed by MCST), foreign organisations are allowed to form part of the project consortium but are not eligible for funding. With regard to the various grant schemes operated by Malta Enterprise, access is restricted to enterprises registered in Malta, in view of the fact that the schemes are targeted at stimulating industrial and economic development in Malta. The post-graduate and doctorate scholarship schemes financed through public funds and managed by the Ministry for Education and Employment are only open to Maltese citizens or to those having obtained permanent residence in Malta.

Portability of national grants is observed to some extent in the local PhD fellowship schemes, where beneficiaries are free to pursue their studies at their University of choice including overseas. Other grant schemes primarily target organisations rather than individuals, and portability is not an option in this case.

The National R&I Strategy 2020 does not address the issue of access to and portability of national grants and there are no planned measures or changes to the current situation.

### **3.2.4 EURAXESS**

Due to the small size of the country, in Malta the EURAXESS network is centralised. The MCST took over responsibility for this from the Temi Zammit Foundation (a NGO) in September 2014 and will manage Malta's Euraxess portal as part of the TOP III project.

### **3.2.5 Doctoral training**

In Malta doctoral training is available primarily through the University of Malta which is the only public university on the island. The University enjoys a high degree of autonomy in establishing the type of doctoral training that it offers, although this is enshrined in legislation as part of the Education Act (Cap. 327). The relevant regulations do not make reference to Innovative Doctoral Training.

A doctoral research proposal is prepared by a prospective student in collaboration with the principal supervisor, and must be reviewed and accepted by the Faculty Doctoral Committee before going to the Senate Doctoral Committee for final approval. During the course of the research, the principal supervisor is required to submit an annual progress report to the Faculty Doctoral Committee which ensures that progress is adequate and up to standard. Students are also encouraged to submit their own progress reports to the committee.

The doctoral training of course aims for research excellence, and recent upgrades to the infrastructure and equipment in a number of University laboratories permit the undertaking of better-quality research. The programme is also undertaken in an attractive institutional environment.

Exposure to local industry is not a formal requirement but is generally the case, and the University has a philosophy of pragmatic research tuned to the needs of industry and of the country. Students often have the opportunity to join in international networking activities and to present their findings at conferences overseas.

The principles of innovative doctoral training have not yet been incorporated into the University's approach. Similarly, there is no publicly-available report on evaluation of doctoral training.

### **3.2.6 HR strategy for researchers incorporating the Charter and Code**

Malta has not created an enabling framework for the HR strategy for researchers, and there are no initiatives underway for the adoption of such a strategy.

There are no Maltese organisations which have formally endorsed the Charter and Code, although most of the principles enshrined in these documents are in fact observed. The national R&I strategy recommends that public employers should be encouraged to formally endorse the Charter and Code, but stops short of detailing how such encouragement should be achieved.

Opportunities for researchers have improved in recent years, but Malta has a limited offering in terms of remuneration levels or research infrastructures. Nonetheless, the labour market for researchers appears to be quite attractive and vacancies posted on the University of Malta website seem to be filled without difficulty. With regard to foreign researchers, Malta has put in place the researcher visa regulations and there are no legal or other barriers which hinder access to the scientific labour market by foreign researchers. While there are no specific measures aimed at attracting foreign nationals, the number of foreign researchers has increased significantly in recent years with most of the researchers coming from EU countries.

### **3.2.7 Education and training systems**

A number of policies are in place to encourage more individuals to pursue studies in science and technology. A National Interactive Science Centre is being developed with the aim of encouraging more students to opt for science subjects at secondary school level. At post-secondary and tertiary level, the monthly stipend allocated by central government to students following science and technology subjects is higher than that awarded to students following other subjects.

In order to increase the number of individuals with a doctoral qualification, the MGSS and STEPS scholarship schemes were introduced in 2006 and 2009 respectively. Recommendations and plans for the introduction of a post-doctoral grant scheme have been mentioned in various strategy documents for a number of years. The introduction of such a scheme is envisaged through the use of ESF funding (Ministry for European Affairs, March 2015, OP II) and discussions for the introduction of the scheme are underway.

In December 2012, a draft National Curriculum Framework was published for public consultation which included provisions for the incorporation of entrepreneurship training in the early school years. Following the change of government in March 2013, the Ministry for Education embarked on an extensive consultation process and published a Framework for the Education Strategy for Malta 2014 – 2024. This includes among its goals the improvement of students' learning experiences by encouraging creativity, critical literacy, entrepreneurship and innovation at all levels (Ministry for Education and Employment, Feb 2014).

In 2012 the Ministry of Finance introduced the Entrepreneurship in Education Scheme in which a number of schools are each awarded a budget of €5,000 to organize entrepreneurship training or related activities for their students.

### ***3.3 ERA priority 5: Optimal circulation and access to scientific knowledge***

#### **3.3.1 e-Infrastructures and researchers electronic identity**

This subject is not addressed in Malta's national R&I strategy, and there are currently no measures supporting the development of digital research services, scientific software, data infrastructures for dissemination of knowledge, infrastructure for access to and preservation of scientific information at national level.

However, the University of Malta has taken a number of initiatives of its own accord, such as the implementation of an open source e-learning platform for use by academics, researchers and students. It is also connected to the GEANT education network, thus giving academics and researchers access to digital research services in other countries.

The University of Malta has recently completed a project for the development of a supercomputer laboratory for use by academics as well as by research-performing SMEs. This enhances the research potential of the university as well as facilitating collaboration with industry and the development of a knowledge-based economy.

#### **3.3.2 Open Access to publications and data**

While the National R&I Strategy is positive regarding the concept of open access, formal policies in this regard have not yet been adopted by any Maltese entity. The University of Malta is, however, in the early stages of developing a policy on the subject, although the contents of this policy are not yet clear. The University also launched its much-awaited institutional repository in September 2014, an important step forward since this is the first and only online repository in the country. The Technology Development Programme also promotes the open access concept by encouraging the publication of research results in open access mode, although there is no data on the number of publications arising from this programme. Beneficiaries of the Malta Enterprise research funding schemes for industry have no such obligations.

In spite of the lack of formal open access policies, however, it appears that the percentage of scientific publications which include a Maltese author published in open access mode exceeds the EU average. The results of a recent study are reproduced in the table below (Archambault et al, October 2014).

**Table 6**

	<b>Malta</b>	<b>EU</b>
Green OA journals	5.0%	9.4%
Gold OA journals	21%	8.6%
Other OA journals	29%	34.9%
<b>Total</b>	<b>54%</b>	<b>51.3%</b>

There are no measures to facilitate access for SMEs and unaffiliated researchers to results of publicly-funded research.

## **4. Innovation Union**

### **4.1 Framework conditions**

Work on development of the proper framework conditions for promoting business investment in research and innovation got underway in earnest with the publication of the first national R&I strategy in 2006. This was followed up in the National R&I Strategy 2020, which addresses the topic in some detail and stipulates that the development of a comprehensive R&I support ecosystem is one of its primary objectives. The Malta Enterprise Act of 2003 facilitates the implementation of most measures through the publication of legal notices.

Recent years have seen the introduction of a broad range of supply-side measures to encourage business investment in research and innovation. These include a number of funding schemes providing direct financing of research and innovation activity, as well as schemes which finance ancillary activities such as market research, feasibility studies, risk assessments, IP checks, patent registration, etc. These schemes have been eagerly taken up by the business sector. Other mechanisms such as tax incentives are also in place but have been much less effective than the grant schemes.

Academia is also playing an important role with the University of Malta launching a Knowledge Transfer Office in 2009, followed by the Takeoff Business Incubator and Takeoff Seed Fund in 2014.

On the other hand, demand-side policies have not been given due attention and innovative public procurement has not been leveraged to exploit the potential it offers. The National R&I Strategy makes reference to the importance of such measures, but whether this will translate into concrete actions will only become clear when the associated R&I Action Plan is published. This plan is being developed under the direction of a high-level steering group / core group which include delegates from the various public policymaking bodies and is expected to be finalised towards the middle of 2015.

### **4.2 Science-based entrepreneurship**

In 2013 the University of Malta officially launched a Centre for Entrepreneurship & Business Incubation (CEBI) with the aim of promoting the development of a knowledge-intensive, entrepreneurial culture in Malta. ([http://www.um.edu.mt/cebi/about\\_cebi](http://www.um.edu.mt/cebi/about_cebi)). An Intensive Training Program (ITP) in Entrepreneurship was developed in partnership with ISIS Innovation Limited - the technology transfer arm of Oxford University.

In April 2014 the University of Malta launched the TakeOff Business Incubator (<http://takeoff.org.mt>), a start-up development facility to help innovators and aspiring entrepreneurs create thriving technology and knowledge-based ventures. The incubator will also provide business support and advice. It is partially funded through EU Structural Funds. The University also launched the TakeOff Seed Fund Award in collaboration with central government. This is Malta's first funding programme designed to support early-stage technology and start-up company development. Drawing on a total seed fund of €100,000, grants of between €2,500 and €20,000 will be awarded to help to close the funding gap experienced by researchers and entrepreneurs in the critical early stages of technology commercialisation and start-up development.

Similar initiatives on a smaller scale also launched in 2014 include the MCAST Entrepreneurship Centre run by the MCAST vocational college (<http://www.mcastentrepreneurship.com/about.php>) and the MITA Innovation Hub at Smart City Malta (<http://mitainnovationhub.gov.mt>) which is an initiative of the government's IT agency.

A major public initiative which deserves mention is the Life Sciences Centre (<http://www.lifesciencepark.com>), a state-of-the-art industrial park dedicated to the life sciences sector estimated to cost around €30 million (Ministry of Finance, April 2012, pp 119). This got underway in late 2011 and is scheduled for completion in 2015. The initiative will promote the development of a knowledge cluster between the University of Malta, Malta's general hospital (Mater Dei Hospital), the Malta Council for Science and Technology, the Malta College of Arts, Science and Technology and the Life Sciences industry. It is expected that this initiative will lead to a 0.33% increase in R&D expenditure as a percentage of GDP with 100 direct jobs created by the end of 2020. The Life Sciences Centre will have 50 labs / working units of various sizes.

In 2014, Malta Enterprise also commenced the development of a Digital Hub in San Gwann, which is targeted to be completed in 2015. The project will create an environment conducive to the development and growth of digital creative companies including, but not limited to game development, gamification and bio-informatics and this presents great opportunities for scientific, technical and commercial synergies, with an associated vertical increase in value-added from the digital sector in Malta. The hub will also house incubation and mentoring facilities for budding entrepreneurs.

Malta Enterprise also operates the Innovative Start-Up Programme which incorporates the Kordin Business Incubation Centre as well as a grant scheme which provides financial assistance to highly innovative start-ups. Eligible costs include tangible assets, knowledge acquisition and consultancy services.

### ***4.3 Knowledge markets***

The National IP Office is responsible for registrations of Trademarks, Patents and Designs, and, analyses and processes applications for such registration. It endeavours to raise awareness regarding IP matters through the participation in events such as the annual SME week.

Maltese legislation is in line with the WTO TRIPS Agreement and also with the EU Acquis. Malta is a member of the Paris and Berne Conventions, the WIPO Copyright and WIPO Performers and Producers of Phonograms Treaty, the Patent Cooperation Treaty and the European Patent Convention. Statistics relating to IP registrations are published yearly and also submitted to WIPO and EPO for their own publications.

The following schemes encourage the development of patents:

The Tax Exemption on Royalty Income from Patents Scheme operated by Malta Enterprise aims to encourage researchers and organisations to exploit IP by providing exemption from income tax on income from royalties paid by third parties for use of patented IP. Although a number of applications have been received, the processing is on hold pending EU State Aid verification of the scheme.

The Fusion Programme managed by the Malta Council for Science and Technology is open to both industry and academia and provides financing for (among other things) IP Checks and Patent Applications. This scheme has financed a number of projects. However these are still at an early stage and any resulting patents would be expected as the technologies are furthered in the next 2-3 years. In the meantime, successful pre-2013 (pre-Fusion) projects have resulted in the filing of some limited patents. Fusion is expected to deliver an improvement on patents filed due to the mentoring and focused support it inherently provides to researchers through the Commercialisation Voucher Programme.

#### **4.4 Knowledge transfer and open innovation**

At a policy level, knowledge transfer between industry and academia is strongly promoted through the Technology Development Programme (formerly the National R&I Programme), since this funds projects undertaken by consortia involving partners from both camps. Similarly, the *Loan of Highly-Qualified Experts Scheme* promotes collaboration by providing cash grants to SMEs to part-finance the costs of engaging experienced researchers on a temporary basis to strengthen their research capacity.

The University of Malta regularly pronounces itself strongly in favour of collaboration with industry. At a corporate level, it has set up the Knowledge Transfer Office (<http://www.um.edu.mt/knowledgetransfer>) to promote and facilitate such interaction, and in recent years has obtained ESF funding for an initiative termed *Creating a Knowledge Transfer Framework and Technology Entrepreneurship Programme*. The University's RIDT unit (R&I Development Trust) also works towards this objective, focusing on encouraging industry to contribute to its trust fund to finance research which will benefit the contributor. At an individual level, the University's employment regulations also encourage academics to work with industry.

In spite of this, however, the level of collaboration between industry and academia at a corporate level remains low. Most business research is carried out intramurally and outsourcing to academia is insignificant (Eurostat). One exception to this state of affairs is the 2012 agreement between the University and the Malta Freeport, whereby the two parties have agreed on a collaborative research agenda to be carried out by the University in areas of interest to the Freeport. There are also various instances of collaboration with industry at the researcher level, for example in the fields of engineering, aerospace and pharmaceuticals.

A survey of doctorate holders in Malta indicated that approximately 70% of these are employed in higher education, while only about 6% work in the private sector (Auriol, 2013). These figures seem to imply a lack of qualified researchers in industry, and would suggest a strong need for interaction between the two sectors. Nevertheless, it is believed that mobility between industry and academia is very low, although official figures on this point are not available. It is not clear whether the presumed low mobility levels are due to lack of inclination on the part of university researchers or whether it is a consequence of lack of demand by industry.

It is only in the last decade that the University has adopted a business orientation, and only in the last 5 years that it has started to put in place the necessary framework to promote collaboration with industry. Data for 2011 indicates that the University of Malta had filed a cumulative total of 8 patent applications, while it is believed that none of these have been



licensed or sold to industry. By 2011 the University had not yet launched any start-ups. (Bartolo, July 2011).

With reference to the public sector, the situation is rather bleak and the public sector research does not have a policy of encouraging collaboration with the private sector. Public sector research is mainly geared towards the needs of the national government and is largely limited to the agricultural and fisheries sector. As a consequence, collaboration between business and the public sector is not widespread.

The concept of open innovation is not addressed in the National R&I Strategy, but is briefly mentioned in the National Digital Strategy which states that the government will set up an ICT innovation centre where private enterprise, academia and public bodies can jointly pursue open innovation in the field of ICT. The ICT Innovation Hub was set up in May 2014 (<http://www.mitainnovationhub.gov.mt>) but it is still too early to report on its activities.

#### ***4.5 Innovation framework for SMEs***

In recent years a number of schemes aimed at promoting innovation in industry have been launched by Malta Enterprise, with one of the most popular being the Innovation Actions Grant Scheme. The Fusion Programme managed by MCST has also been successful and provides funding for a number of activities involved in innovation including market research, business planning, meetings with potential investors, product development costing and IP matters.

Other schemes which have been less successful include the Loan of Highly Qualified Personnel scheme, the Preparatory Technical Feasibility Studies Scheme, the Registration for Intellectual Property Tax Credits for SMEs and the Royalty Income from Patents scheme. Malta Enterprise also manages the Innovative Clusters Scheme which provides cash grants to finance innovation clusters consisting of a mixture of SMEs and large undertakings operating in a common sector, with the aim of carrying out or promoting industrial research and experimental development. However, the scheme has not been successful and to date there are no innovation clusters in Malta. Neither is there a knowledge transfer platform, although the University of Malta does operate a Knowledge Transfer Office which offers knowledge transfer services between industry and its staff.

Unfortunately the uptake of many of the schemes has been very low (Ministry of Finance, April 2013, pp 117), but since no evaluation or benchmarking exercises have been carried out it is not clear whether this is because the schemes do not meet industry needs, because of lack of interest in innovation by industry, or for some other reason. These schemes have bureaucratic procedures similar to other local schemes which have been very successful, and it does not appear that this is the cause of their poor success.

The average time to resolve insolvency in Malta is 3 years compared to an EU average of 2 years, while the related costs (expressed as a share of the debtor's estate) are the same as the EU average. The level of support (for example eligibility to benefit from support schemes) for entrepreneurs seeking a second start remains below the EU average (Malta 77%, EU 82%). There were no significant policy measures announced or implemented in this area in 2013 or in 2014 (EC, July 2014).

There are no existing partnerships between Maltese agencies and the EC on EU R&I programmes with a focus on SMEs.

#### **4.6 Venture capital markets**

Availability of venture capital funding in Malta has been a problem area for a number of years, and although there have been some past attempts by the national government to set up such schemes these were never met with success. Plans for a hybrid venture capital fund were announced in the 2014 Budget Speech (MFIN, Nov 2014, pp31) and Venture Capital Malta was launched in February 2015. This takes the form of a public private partnership and will provide a platform for attracting venture capitalists to Malta.

A Business Angels Network was established in Malta in 2003 but was not successful for a number of reasons, including the quality of the sales pitches to the business angels by potential start-ups, lack of willingness to dilute ownership by founders, high expectations of entrepreneurs and the fact that Malta's small size facilitates informal approaches to venture capital which did not require the usage of this formal business angels network (MBB, April 2013).

Seed capital is also a problem although in recent years there have been two initiatives focusing on start-ups. One of these was the JEREMIE initiative which was run in collaboration with a local bank (<https://www.bov.com/page.asp?p=13355>). In 2010 Malta Enterprise launched a scheme targeted at small start-ups which has funded a number of beneficiaries, but this did not cater for high-risk ventures (<http://www.maltaenterprise.com/en/support/erdf-small-start-grant-scheme>). This was funded through ERDF funds and came to a close in 2013. Plans for the launching of a seed capital fund are once again in the pipeline (Ministry of Finance, Nov 2013, pp30), with the intention of setting up a fund with a budget of €11 million over a 5-year period financed through the ESF structural funds. It is expected that the start-up grants will help finance between fifty and one hundred Knowledge-Intensive start-ups. Progress on this is held up until the relevant operational programme is finalised and calls are issued.

The possibility of using crowdfunding as a means of raising capital has been mentioned sporadically but there are few if any cases where such a mechanism was successfully used in Malta.

#### **4.7 Innovative public procurement**

To date there has been little effort in promoting innovative public procurement and there are no schemes, budgets or targets related to this concept. The National R&I Strategy makes a brief reference to this, but It remains to be seen whether this will be addressed in the R&I Action Plan which is currently being prepared.

There is rather limited evidence of progress in the leveraging of public procurement of innovative goods and services. One such case study was reported in the final report of the ERA-PRISM project (ERA-PRISM final report, Sep 2011), which gives an account of procurement undertaken by the Maltese national IT agency MITA. This involved the purchase of ICT infrastructure for the Active-Active Data Centre. Rather than specifying a set of technical requirements, the tender stipulated a set of business requirements with the objective of increasing the potential innovativeness of this project. The key adjudication criterion was value for money, expressed as the lowest long term cost over the lifetime of the project.

## 5. Performance of the National Research and Innovation System

### 5.1 Performance of the National Research and Innovation system

On average in 2012, Malta produced 9.53 publications per 10,000 inhabitants, well below the EU-28 average of 13.8. Almost half (49%) of these are internationally co-published. In 2012, Malta had about 467 international scientific co-publications per million population ranking 20<sup>th</sup> out of the EU28. In the period 2002-2012, 9.7% of the Maltese scientific publications were in the top 10% most cited publications worldwide in comparison which is only slightly lower than the EU-28 figure of 11.2% (Science Metrix, 2014)<sup>2</sup>. The share of public-private co-publications in Malta was 1.3% in the period 2008-2013 against 2.8% for the EU-28<sup>3</sup>.

**Table 7: Assessment of the Performance of the National Research and Innovation System**

<b>1. ENABLERS</b>	Year	MT	EU
<b>Human resources</b>			
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	2011	0.30	1.70
Percentage population aged 30-34 having completed tertiary education	2012	22.40	35.80
<b>Open, excellent and attractive research systems</b>			
International scientific co-publications per million population	2012	399.96	343.15
Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country	2009	4.77	10.95
<b>Finance and support</b>			
R&D expenditure in the public sector as % of GDP	2012	0.33	0.75
Venture capital (early stage, expansion and replacement) as % of GDP	2012	N/A	0.08
<b>2. FIRM ACTIVITIES</b>			
R&D expenditure in the business sector as % of GDP	2012	0.50	1.31
<b>Linkages and entrepreneurship</b>			
Public-private co-publications per million population	2011	8.41	52.84
<b>Intellectual assets</b>			
PCT patent applications per billion GDP (in PPSE)	2010	0.68	3.92

<sup>2</sup> These publication data are based on Elsevier's Scopus database. ScienceMetrix, Analysis and Regular Update of Bibliometric Indicators, study conducted for DG RTD. They represent an update of the data displayed in the table below. See also [http://ec.europa.eu/research/innovation-union/index\\_en.cfm?pg=other-studies](http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=other-studies)

<sup>3</sup> Scival 2014, Scopus based publication indicators derived from Elsevier's SciVal platform, [www.scival.com](http://www.scival.com) last accessed December 2014."

PCT patent applications in societal challenges per billion GDP (in PPSE€) (climate change mitigation; health)	2010	0.11	0.85
<b>3. OUTPUTS</b>			
<b>Economic effects</b>			
Contribution of medium and high-tech product exports to trade balance	2012	3.42	1.27
Knowledge-intensive services exports as % total service exports	2011	11.16	45.26
License and patent revenues from abroad as % of GDP	2012	0.25	0.59

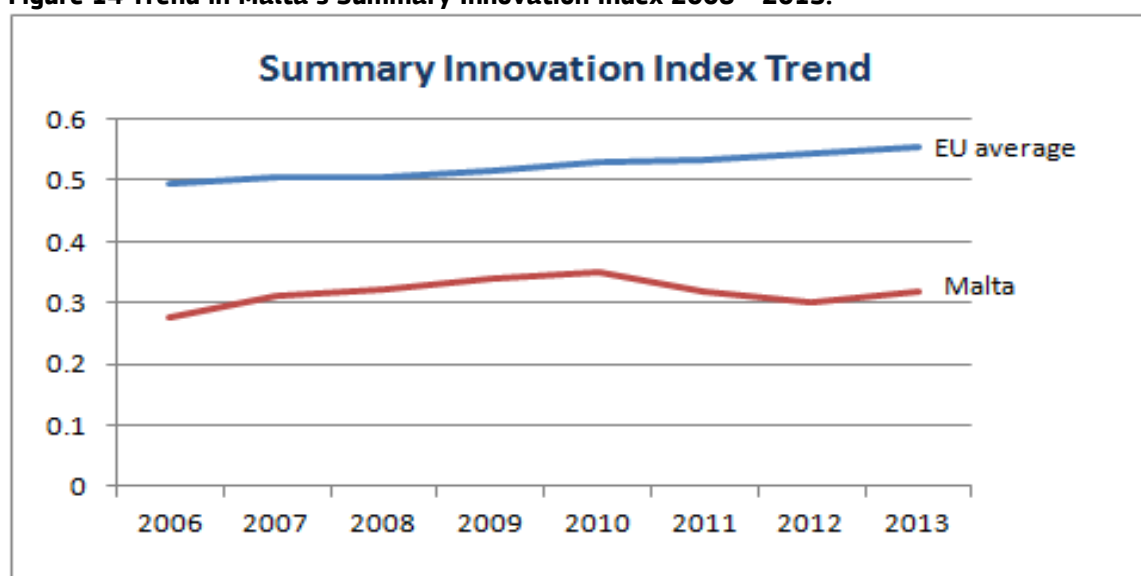
Source: European Commission, IUS Database (2014).

Malta belongs to the group of moderate innovators, ranking eighth out of the eleven countries in this category. Malta experienced growth in the IUS summary innovation index over the period 2006 to 2010 but then slipped in 2011 and 2012 before recovering slightly in 2013. While in 2007 it ranked twentieth in the EU27, in 2013 it stands in twenty-second place with a score of 0.319 compared to an EU average of 0.554. Despite having registered growth in a number of indicators, Malta failed to keep pace with average EU growth rates in the last three years and thus its normalised score has decreased and its ranking fallen.

**Table 8: Malta's Summary Innovation Index 2006 - 2013.**

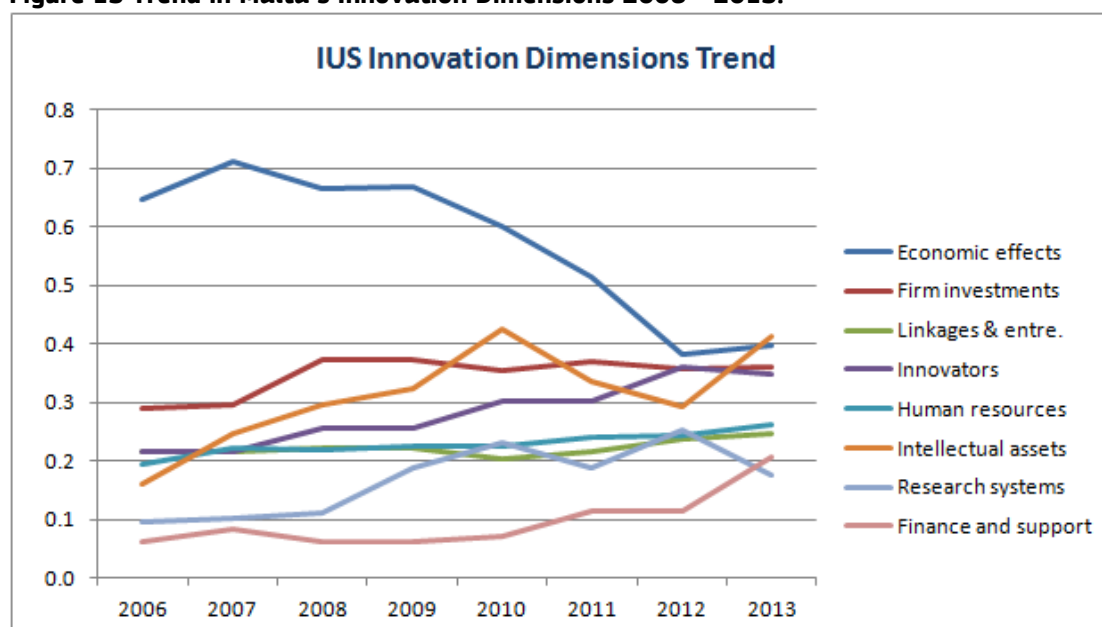
	2006	2007	2008	2009	2010	2011	2012	2013
IUS - EU average	.493	.506	.504	.516	.531	.532	.545	.554
IUS - Malta	.278	.312	.323	.338	.349	.317	.300	.319
Malta as % EU average	56%	62%	64%	66%	66%	60%	55%	58%
Malta ranking of EU28	23	20	20	20	20	22	23	22

**Figure 14 Trend in Malta's Summary Innovation Index 2006 - 2013.**



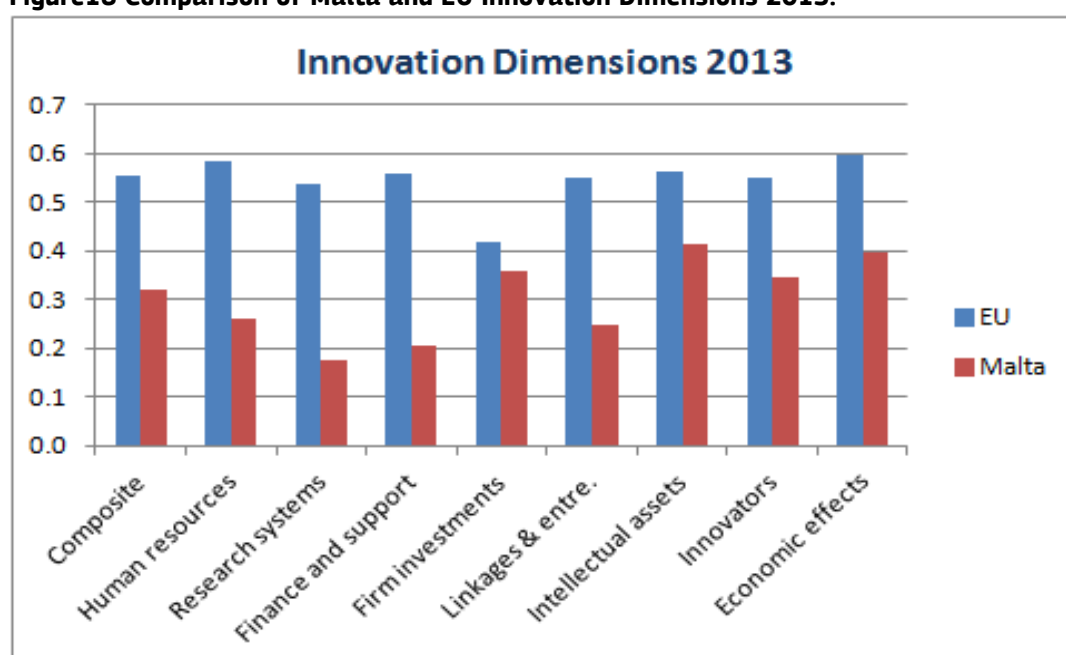
With reference to the eight innovation dimensions, it can be seen from figure 15 that most of these showed a positive trend over time with the exception of *economic effects* which plummeted from 0.71 in 2007 to 0.40 in 2013. This was in fact the main factor leading to Malta's poor performance overall.

**Figure 15 Trend in Malta's Innovation Dimensions 2006 - 2013.**



In 2013 Malta performed best compared to the EU average on *firm investments* (14<sup>th</sup> position) and *intellectual assets* (16<sup>th</sup> position), but scored poorly on all other dimensions ranking twentieth or lower in all cases. It is particularly weak in *linkages and entrepreneurship* (24<sup>th</sup> position), *finance and support* (25<sup>th</sup> position), and in *human resources* (last).

**Figure16 Comparison of Malta and EU Innovation Dimensions 2013.**



In terms of individual indicators, Malta ranks last within the EU in *knowledge-intensive services exports* and in *doctorate graduates per 1000 population* with an estimated 9 – 14 such graduates annually. The STEPS doctorate grant scheme which was introduced in 2009 funded 80 doctoral students over a seven-year period (NRP 2020, April 2013, pp201) and should lead to significant improvement on this score in the next two years when the beneficiaries of this scheme obtain their doctorate (the IUS 2013 makes use of 2011 data for this indicator). However, many of these doctoral students pursue their studies overseas, and may not be included in the official figures.

While statistics on applications to national patent office are not always comparable across countries, they can provide some indication of technological development activities that are not captured by EPO/PCT data. In Malta approximately 55 patent applications were made at the EPO in the period 2000-2010, and about 48 patent applicants took the PCT route. The National Patent Office received almost 99 applications in this period (these three figures are based on fractional counting) (INCENTIM KU Leuven, Università Commerciale Luigi Bocconi, 2014).

On a positive note, Malta scores above average in a number of indicators including *international scientific co-publications*, *non-R&D innovation expenditures*, *community trademarks*, *employment in knowledge-intensive activities* and *contribution of medium/high-tech exports to trade balance*. Consistent positive trends were observed in *international scientific co-publications*, *public expenditure on R&D*, *business expenditure on R&D*, *public-private co-publications*, *community trademarks*, *SMEs introducing product or process innovations*, and *employment in knowledge-intensive activities*. However, its previous strong performance in *sales of new to market innovations* has been lost and it now scores below the EU average on this indicator.

## **5.2 Structural challenges of the national R&I system**

The principle structural challenges facing the R&I system in Malta are outlined below.

### **1. Developing research excellence at the University of Malta**

The level of R&D expenditure in the higher education sector is low by EU standards, and most of the funding allocated to the University of Malta is immediately absorbed by personnel costs and other recurrent expenses. Funding for research projects is very limited, and there are few full-time researchers especially at the post-doctoral level (Camilleri, 2010 pp36). Whilst the University is eager to develop areas of excellence and has the potential to do so, lack of funding severely impacts its endeavours in this area. The limited levels of excellence make it difficult for the University to benefit from certain Horizon 2020 funds such as the ERC Frontier Research programme. Lack of project funding also contributes to Malta's poor rating on the IUS *international scientific co-publications* indicator.

### **2. Investing in human capital**

Malta ranks last within the EU in terms of doctorate graduates per 100 population aged 25-34. At a national level, employment opportunities for post-doctoral researchers are in very short supply both at the University and in the public sector, presenting a major obstacle to the development of a pool of experienced researchers. This in turn can act as a

disincentive to foreign industry potentially interested in establishing R&D facilities in Malta, and contributes to a brain drain and to the loss of important talent as researchers seek opportunities overseas.

### **3. Increasing R&I in the private sector**

The level of BERD in Malta is very low compared to the EU average, 0.46% of GDP compared to 1.29% of GDP in the EU in 2013. This is further reflected in very low scores in the IUS in a number of indicators such as *number of SMEs innovating in-house, SMEs introducing product or process innovations and collaboration between innovative SMEs*.

### **4. Bringing research to market**

Capitalising on the investment in R&I through the development of marketable products and services presents another challenge for Malta. Applied research conducted by industry is generally undertaken with this objective in mind, but marketing a new product or service still presents a challenge and demands a different set of skills to the technical skills involved in developing the product. SMEs in particular could well be lacking such skills, or the finance to buy in the required expertise.

In the case of research conducted by academia, results which have the potential for commercialisation may be achieved but there are no documented cases of such activity or of the creation of spinoffs.

### **5. Smart specialisation**

Smart Specialisation is very important in a small country such as Malta in order to develop areas of expertise despite its limited financial and other resources. Although R&I policy has focused on a number of thematic areas in recent years, these have been defined in rather broad terms and are not sufficiently focused.

The analysis of the Polish data indicates the following key challenges, faced by the national innovation system.

## **5.3 Meeting structural challenges**

### **1. Developing research excellence at the University of Malta**

In recent years the University of Malta has tapped ERDF funding for upgrading its research facilities. However, its institutional funding allocation for research projects is very limited and does not permit the establishment of stable research streams. Neither does the current policy mix include the possibility of obtaining the required funding through other sources. Inadequate funding is severely hampering the University's efforts to develop research excellence (Camilleri, 2010 pp36).

### **2. Investing in human capital**

At the doctoral level, the STEPS scheme launched in 2009 addressed the need for more doctoral graduates to some extent. This scheme has now come to a close and has been replaced by the Endeavour Scholarship Scheme. At the time of writing this report in May 2015 details of this scheme are still emerging and the financial allocation is not clear.

An important development is the launch of the Reach High Post-doctoral Grant Scheme in May 2015.

### **3. Increasing R&I in the private sector**

The R&D Grant Scheme and Innovation Actions Grant Scheme funded through ERDF met industry requirements and helped to increase R&I activity in the private sector. The schemes were eagerly taken up by industry indicating that absorptive capacity in the business enterprise sector is not an issue at this point. In the R&D Grant Scheme, 74% of the beneficiaries were small enterprises, 21% were medium-sized ones and 5% were large enterprises, indicating that such schemes should have a significant benefit on the R&I activities in the critical SME category (Malta Enterprise, May 2015).

In contrast, the R&D tax credit schemes also managed by Malta Enterprise are not effective, failing to attract any applicants (Ministry of Finance, April 2013, pp 119).

The evidence clearly points to the need to re-establish research and innovation grant schemes for industry under the new ERDF programme and to increase funding levels. These initiatives should be supplemented by similar schemes designed to promote collaborative research between innovative SMEs.

### **4. Bringing research to market**

The mix of policy measures required for promoting commercialisation of ideas and research results is perhaps one of the most challenging in the R&I context, and is also the area where Malta has the greatest shortfalls.

The Fusion Programme managed by the Malta Council for Science and Technology provides funding for a suite of activities related to commercialisation, but does not cover operational costs. Whilst it constitutes an important policy measure, the funding which is available is very limited and funding levels need to be significantly increased.

The University of Malta has in recent years introduced measures to facilitate commercialisation of research such as the setting up of the Knowledge Transfer Office in 2009, followed by the Takeoff Incubator and Seed Fund in 2014. Whilst this is a very positive development, funding levels are very low and these measures need to be strengthened considerably.

Proper seed funding is not available although there were some schemes targeting start-ups and small enterprise (e.g. the JEREMIE scheme and the Small Start-up Scheme). Plans for the launching of a seed capital fund were mentioned in the government budget speech of October 2013 and would have been a welcome addition to the policy mix but have not yet been implemented.

There are no venture capital schemes in Malta. The intention to set up a hybrid venture capital fund was announced in the budget speech in October 2013 but nothing has materialised by the time of writing of this report May 2015.

### **5. Smart specialisation**

Malta's Smart Specialisation Strategy was published in early 2014 but the defined specialisation areas are rather broad and the strategy was only articulated at a high level. Work is underway on the development of a detailed implementation plan, including lines of action, targets and financial commitments, which is due for publication towards the middle of 2015. Once this plan has been released it will be possible to assess the proposed lines of action in relation to Malta's needs.



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## **Annex 2 - Abbreviations**

BERD – Business Enterprise R&D

BES – Business Enterprise Sector

CEBI – Centre for Entrepreneurship and Business Incubation

GERD – gross domestic expenditure on R&D

HEI – Higher Education Sector

MITA – Malta Information Technology Agency

MFIN – Ministry of Finance

MBB – Malta Business Bureau

MCAST – Malta College of Arts, Science and Technology

MCCEI – Malta Chamber of Commerce, Enterprise and Industry

MCST – Malta Council for Science and Technology

PNP – Private non-Profit Sector

RIDT – Research & Innovation Development Trust

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